THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

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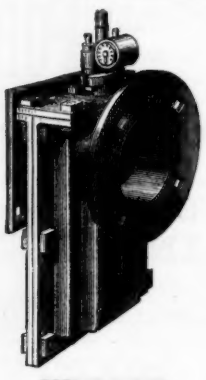

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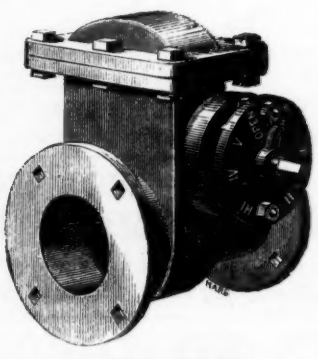

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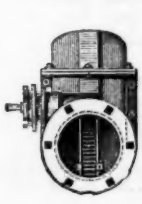

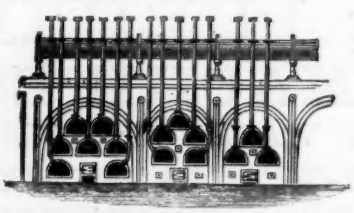

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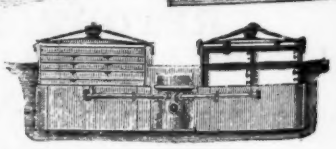

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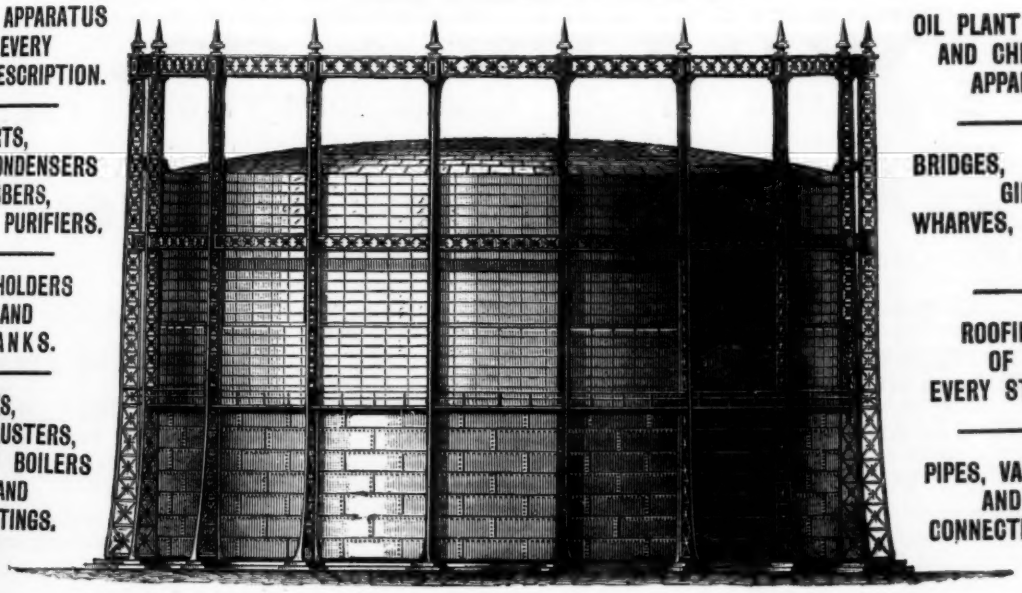

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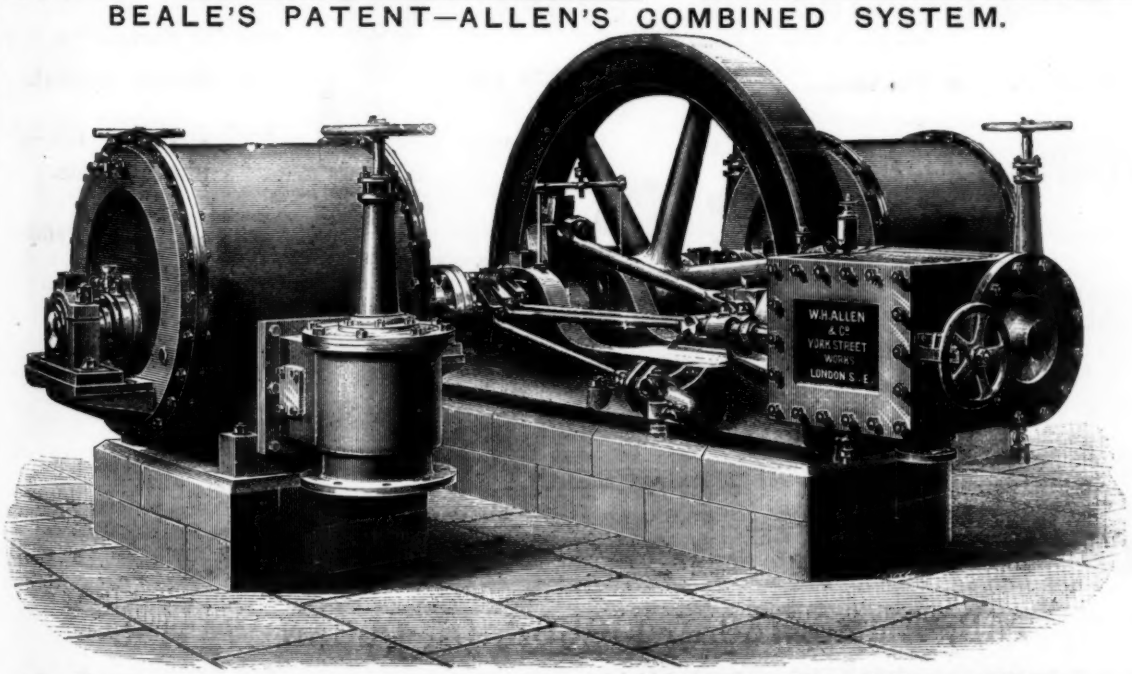

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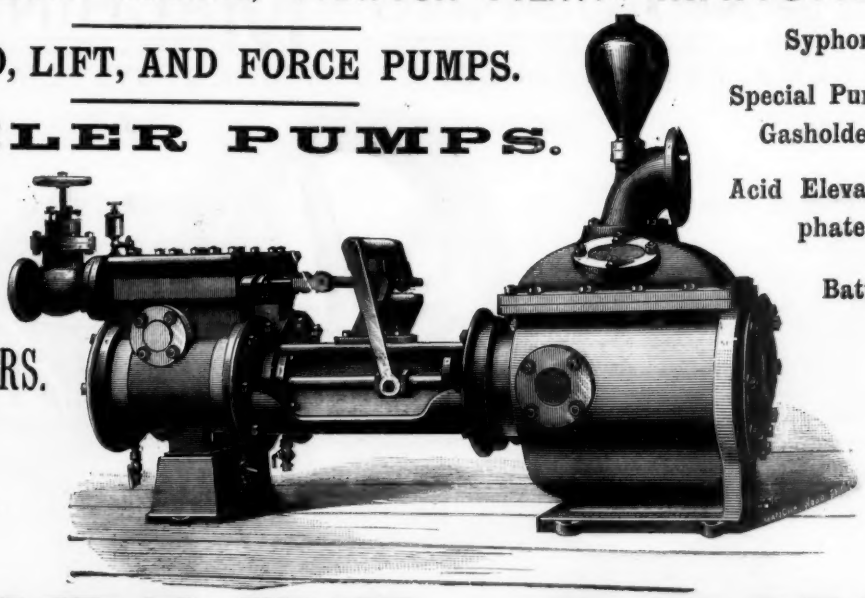

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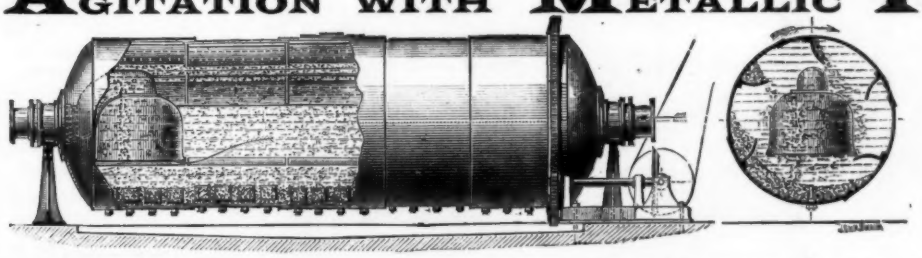

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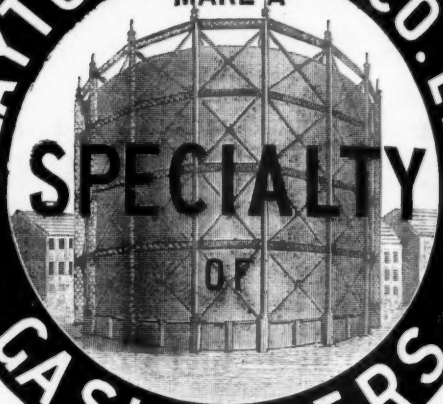

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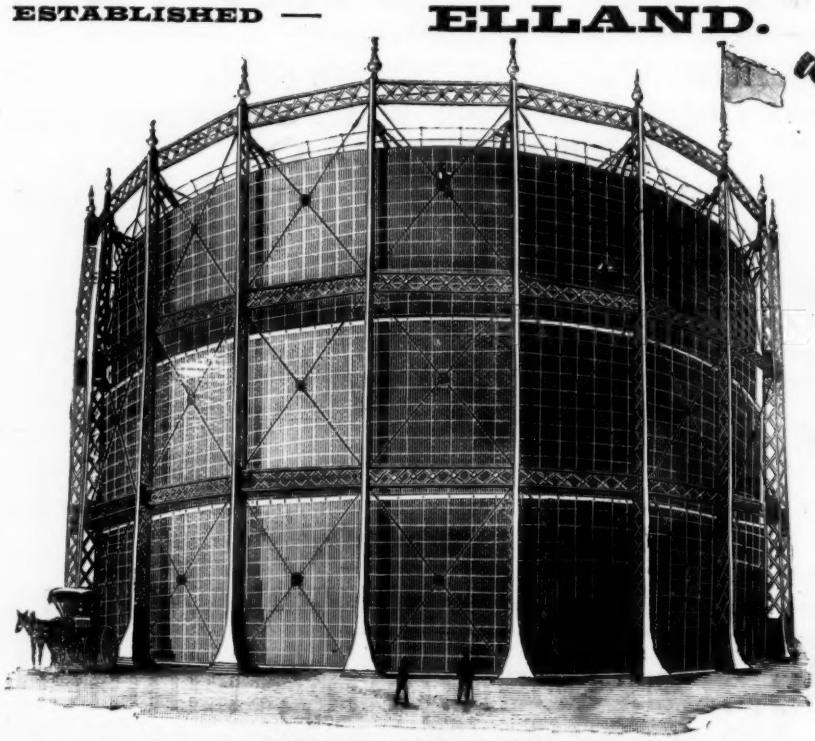

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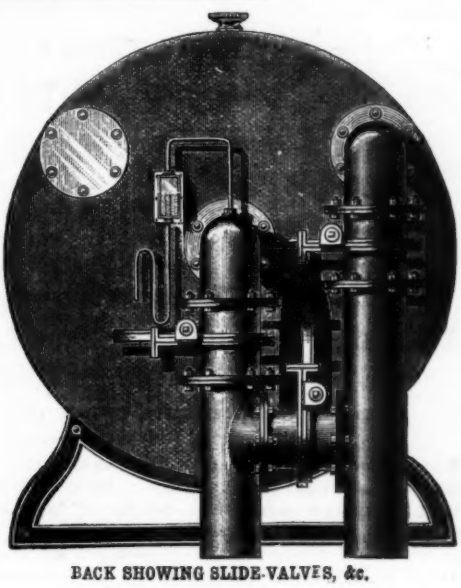

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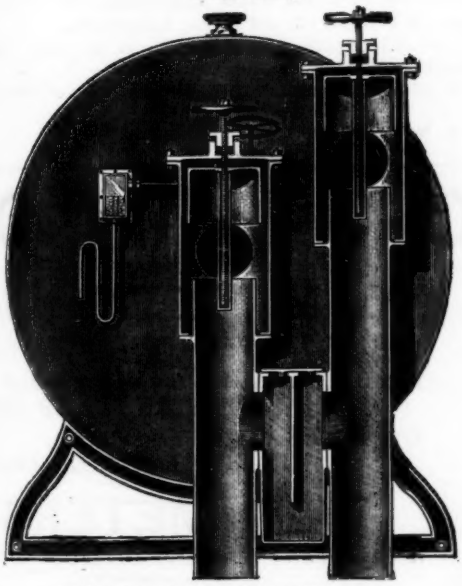

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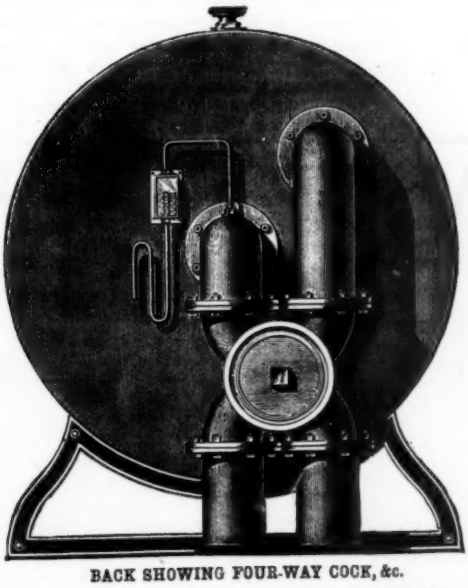

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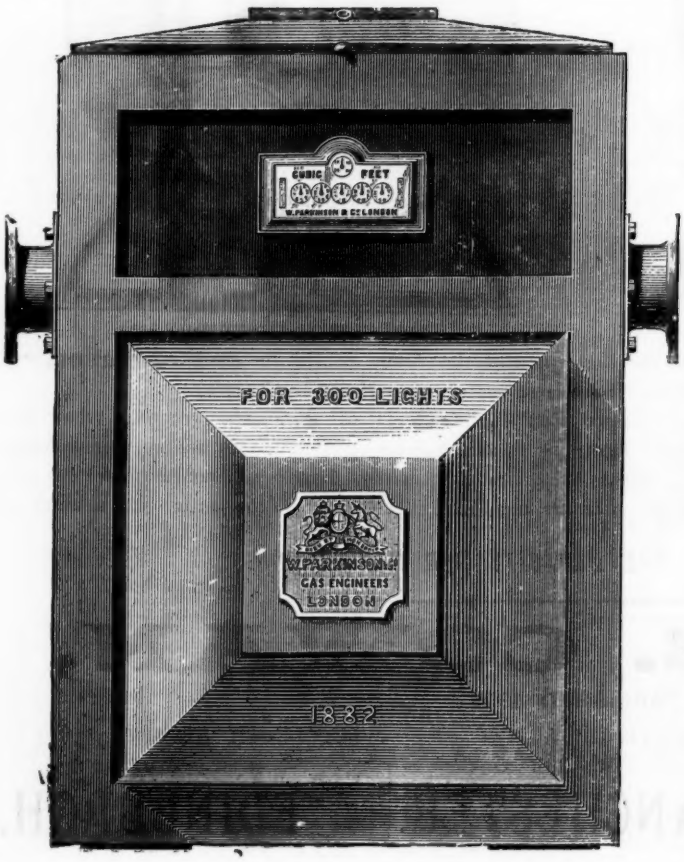

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THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, MAY 6, 1890.

The New May-Day Celebration.

THE day that was to have been fraught with Fate for dynasties, governments, and social systems—the First of May, when the working man all over the civilized world was to rise in his millions and display his irresistible might—has come and gone; and nothing has happened. To descend from the heroic to the familiar, the threatened display of the mastery of Labour was a mere fizzle everywhere, and more especially in London. We have seen at last the great social upheaval, as described in awe-inspiring language by Sunday lecturers and fiery demagogues carefully reported by "liners" in search of "copy;" and we hardly knew it for more than a very poor "out-of-work" demonstration. What with Mr. Cunningham Graham in the House of Commons, Mr. John Burns in the London County Council, Mrs. Annie Besant on the London School Board, and half-a-dozen others whom we cannot stay to name, carefully advertised in conspicuous places as Social Democrats, Tribunes of the People, and Leaders of the Great Protest of Labour against Capital, it might have been thought that our May-Day parade would have been at least suggestive, if not terrible. Nobody expected the May-Day procession in London to prove embarrassing to the Government, like the simultaneous movements among inflammatory Continental town populations; but it was certainly thought that the occasion would be taken for showing a sample of the revolutionary forces that, the British public is so often assured, slumber uneasily under the peaceful surface of Metropolitan life. The reality came ludicrously short of even this modest anticipation. If any of the supposed leaders of the revolutionary army happened to patronize the muster, they left early, more ashamed of their levy than was Falstaff of his ragged regiment. Like him, they declined to march with them. Henceforth, when any of these self-appointed generals without an army speaks in the name of his imaginary following, it will be known what the pretence is worth. Never was there a more ridiculous break down of a much-heralded "demon-"stration." Judging from Thursday's show, it will be a long time before Social Democracy in this country gets more respectable adherents than street corner men, errand boys out of place, and loafers of the class that may be best described as "known to the "police." On the Continent, though the authorities were mostly so well prepared for rioting that nothing of the kind happened, in some places the labouring class has given trouble during the past week. The gas supply of Vienna was at one time supposed to be imperilled; and in one or two other cities, factories were forcibly closed in consequence of proceedings describable as striking attended by rioting. There is nothing very extraordinary in all this. Continental politics have been very quiet, not to say dull, of late; and experience shows that the populace of some peculiarly volcanic regions effervesces at intervals in one direction or another. There being no wars on hand, or threatening just now, the vague restlessness that troubles the rulers of Republics as much as it does Kings and Emperors, breaks out in Socialistic and Anarchical risings. It will be fortunate if the month passes over for all Europe without serious disturbance.

In striking contrast with the May-Day *fiasco* was Sunday's Hyde Park demonstration in support of the general idea of an "eight hours working day." What with the splendid weather, and the facilities provided by the existence in the Metropolitan area of countless workmen's clubs organized for various purposes, the promoters of this manifestation were able to get together a crowd described as one of the greatest in point of numbers ever seen in London. It has been estimated that some quarter of a million of people of all ages, wholly belonging to the wage-earning class, assembled in the Park on Sunday afternoon. They came from all parts, in conveyances numbered by thousands, and on foot in such throngs as to turn the generally dull Sabbath streets into a semblance of their week-day aspect. They held their meeting; listened as well as circumstances permitted to speeches the enthusiasm of which was frequently in strong contrast with their own good humour; and went home quietly and soberly afterwards. That such a throng of the poorer orders of a metropolitan population should assemble at the bidding of their own leaders, march through miles of streets, and eventually disperse without the slightest disturbance of the peace, is a fact highly creditable to all concerned. The truth of the matter is, of course, that those who took part in the demonstration knew there would be no opposition to their proceedings, so long as they behaved themselves in an orderly fashion. Moreover, there is as yet no strong sentiment in favour of the eight-hour day, as there was when the nine-hours movement was started; and where there is no strength of feeling, it is easy to preserve equability of temper. It would be more impressive if the speakers at these mass-meetings of the wage-earning class were not such familiar figures, and their oratory a little less monotonous. As it is, one knows exactly who will figure on the platforms, and what they will say. There

is a "Stock Company" for these representations, and the performers are not generally the most suitable for the parts they assume. But for this slight drawback, Sunday's gathering must be pronounced a complete success. Of course, the Gas Workers' Union figured conspicuously on this occasion, probably on account of the claim put forward by the heads of the Society to have established the eight-hour shift in gas-works. Even if this claim was justified, it would not affect the fundamental distinction we have drawn in these columns between an Eight-Hour Shift and an Eight-Hour Day.

The Official Examination of London Gas.

THE question of the official testing of London gas has been under discussion for a long time; but it came to a head within the last week, and was to have been brought before Parliament last night by Mr. Boulnois, who, as a member of the London County Council, is naturally desirous of clearing up the muddle into which the matter has been allowed to fall. The immediate cause of the crisis is the rebellion of the South Metropolitan Gas Company against the latest example of the Referees' intention to make photometry a progressive art, in the shape of the instrument set up at the station in Hill Street, Peckham. The Company have had infinite trouble over the Blackfriars Road photometer, which has cost them thousands of pounds in cannel; and when a second machine of the sort was ordered by the Referees, they prepared for eventualities. Hill Street is on the trunk line of main from the Old Kent Road station to the populous districts of Peckham and East Dulwich; and there was never any difficulty in satisfying the Examiner there until the new fangled photometer came into his hands. Then bad reports began to occur; whereupon the Company promptly and forcibly objected by cutting off the service to the station. As will be seen by the report in another column, both parties have been to the Board of Trade on the subject. After their first practical protest, the Company again laid on the gas, as though to indicate that they were by no means disposed to be virulent in their opposition to the policy of the Referees; but they cut off the service a second time on finding that matters were no better. This proceeding should force the Board of Trade to do something to relieve the deadlock in which the Referees, the County Council, and the Gas Companies have been impotently struggling for so long. The Earl of Rosebery, in his recent review of the work of the County Council Committees for the past year, referred to the gas testing, and said that the Council wished to improve upon the usual method of examination. As, however, his Lordship's ideas of improvement seemed restricted to the legalization of the portable photometer, which the Council are not now supposed to be asking for, it is difficult to agree with them. To say, as Lord Rosebery is reported, that "no testing of gas could be "efficient unless it was extended much beyond its present "scope," means, if it means anything at all, that the whole scheme of gas examination ought, in the speaker's opinion, to be remodelled. It is evident, from the tenor of his remarks, that Lord Rosebery's information upon this subject is drawn from one side, and that he has never heard the other. All wisdom of this kind is not, however, confined to Spring Gardens; and if the County Council are to escape from repeating the narrowness of view which characterized their predecessors in place, they must open their eyes wide enough to see more than one point in the questions with which they have to deal in association with other parties.

No Royal Commission for Salford.

THE party of Salford ratepayers who are desirous of the appointment of a Royal Commission to investigate the administration of the borough affairs, scandalized by recent events, met with cold comfort from Mr. W. H. Smith when their deputation waited upon him at the Treasury to beg for Government assistance in the matter. Their spokesmen repeated the thread-bare rigmarole about the heinous crimes and breaches of trust that somebody is supposed to have committed in and about Salford; but they must have been staggered by the douche of frigid common sense that was poured on them, in reply, by the practical-minded First Lord of the Treasury. Some people in Salford have been talking about a Royal Commission without realizing the meaning of the term. It was a good mouth-filling phrase; and so they used it to conjure with. They pretended to believe that a Royal Commission would effect miracles in the way of exposing shameful secrets, and would rehabilitate Salford in some mysterious fashion without trouble or expense to anybody in the town. When told that possibly if the petitioners got their Commission, they might be charged with the cost of it, the cheeks of members of the deputation must have blanched. Mr. Smith did not send the Salford folks away until he had cleared their minds of most of the cobwebby stuff with which they have been crammed by the local scandal-mongers. He assured them that not until the ordinary resources of the law had been exhausted, would a Royal Commission issue to do the dirty work which they seem personally afraid to touch. Some of the Salford complaints may be remedied by law; and others are too vague to be handled by any tribunal. The course of the would-be investigators and reformers is now plain. Government will not help them; but they retain the inalienable Englishman's privilege of combining to help themselves. If Mr. Mandley and his associates really represent a strong party of the ratepayers of Salford who believe that there are grounds for action against anybody, and that they are the men to take such action, let the fact be made manifest by the formation of a Committee with means supplied by subscription to fight out the whole question of the Hunter compact, and all the rest of it, in the Courts. If this course is not taken, it will be in vain for Mr. Mandley and his party to keep up their clamourings for investigation, restoration, retribution, and what not. They will be regarded with equal derision to that which now greets any casual mention of the fallen brazen image, with feet of clay, that was once lifted up in the same locality to receive adoration as the embodiment of Commercial Purity. Let us meanwhile quit the subject; for it hath a nauseous taste.

Coal Owners and the Rise in Coal Prices.

GRAVE complaints are being raised by all Gas Companies, but especially those taking their coal from the regions affected by the late miners' strike, to the effect that the colliery owners have combined to raise the price of coal twice and even three times as much as would be required to provide the advanced wages paid to the men. Advances of three and four shillings per ton are common; whereas a shilling would in most cases amply recoup the owners for all the additional expense and trouble they have been put to by the recent action of the men. It is nothing else than a "ring" that these grasping traders have made among themselves; and they will richly deserve the retaliation that is certain to be meted out to them some day. How they roar when their workmen ask for a shilling a week more money; and how quietly they give in when they find they cannot help themselves, piling it on their customers afterwards! We do not wish to do anyone an injustice; and therefore if any responsible person connected with the Midland, Lancashire, or South Yorkshire coal trade will undertake to prove in our columns that the present advance in the price of gas coal at the pit in these districts fairly follows from the recent action of the miners, he shall have as much space as he can reasonably ask for, and every facility for establishing his case. Failing this response, we shall continue to hold that there is neither fairness, common sense, nor anything else but senseless greed at the bottom of the action of the coal-owners, who are simply preparing a rod for their own backs in the near future. These complaints of the Gas Companies are taken note of by the leaders of the men, who have so far beaten the employers every time. The coal-owners can pull together when it is a question of putting up the price of coal; but when the miners are bringing up their tools, they hurry to give each other away. It is to be hoped that the Gas Companies affected will do all they can to break down this abominable system. By restricting their purchases to the lowest possible amounts, they may easily induce these plotters to underbid each other in the attempt to keep up the average sales. There is little mutual reliance among them, as may be seen when they are driven into a corner by their men. Every one would sacrifice all the rest then, to protect himself; and so it will be if buyers keep cool heads and face these combinations in a proper way. It may be said that we are hard upon the coal-owners, not all of whom deserve censure. So be it; but, before we apologize, will anybody kindly show in strict

confidence as to name, but openly as to figures, why gas coal should have gone up in price as it has done during the past three months? If there is any unfairness in this challenge, we should like to be told wherein it lies.

Pirates Beaten Off.

It is reported that the Rhode Island Senate have indefinitely postponed the Bill for authorizing the establishment by Messrs. Addicks and Co. of competing gas-works in the cities of Providence and Pawtucket. This is a particularly satisfactory termination, for the time being, to a project of law which could only have succeeded through the ignorance and laxity of some members of the State legislature and the corruption of others. It is the second defeat sustained by the Addicks combination in Rhode Island; and as the damaging effects of exposures such as these people have had to endure in connection with the rejection of their scheme fall heavier, in more than geometric ratio, with every repetition, it is to be understood that Rhode Island at least will hear of them no more. There are yet States in the Union in which the name of the firm may be unknown, and consequently to this extent respectable enough to be included in a Gas Bill. But the Journal is widely circulated throughout the States; and there is enough about Mr. Addicks and his associates in gas piracy in our last few numbers to enlighten any State Legislature respecting their character, object, and influence. Mr. Bellamy, the clever author of "Looking "Backward" (which it is the correct thing to quote just now), would likely regard Mr. Addicks and his companions as interesting cases of Atavism, inasmuch as in them the propensity of the unregenerate man to piracy and wrecking appears sufficiently refined and attenuated to escape the rough repression of the common law. In time this might be further bred out of the stock, so as to be traceable only by an expert in psychology as plagiarism in an author, or in an incurable trick of peeping over an opponent's hand at whist. For the time being, however, it is something to be thankful for that even one—albeit nearly the smallest—State of the American Union is closed to Mr. Addicks; and it would be a distinct gain to his countrymen if he and his like could be relegated to the limits of the old-fashioned, which would do more to keep them harmless than if they were convicted of all the sins mentioned in the Decalogue. If the *soi-disant* go-ahead citizens of the States could only see it, they are more antiquated in their gas policy than any other people. A generation has passed in England since the failure, in respect of the regulation of gas supply, of the common commercial principle of free competition was recognized by Parliament, which can never in matters of the kind be accused of anticipating the popular judgment. And if ever the adoption of a principle in trade was justified by results, this of treating British gas undertakings as regulated monopolies has been. From that epoch, the process of cheapening the gas supply of England has gone on with hardly a check. It is marvellous that the citizens of the United States should have missed this lesson so completely as they have done—persisting in a blind worship of competition, notwithstanding that they are made to bleed for it so smartly and constantly. Yet, until they can be brought to realize the necessity of remodelling their gas policy, Addicks will be repeated in the future as he was preluded in the past. If we could only persuade the honest members of the United States legislatures—we have no arguments for those who do not fall under this classification—that the only way to obtain cheap gas in their cities is to protect invested capital, so that it may bear a burden of interest light in proportion to its security, while taking safeguards for the due performance of services in return for protection, and offering inducements to economical administration, we should look with equanimity on the demand for British capital to aid the development of the American gas industry. Failing this, and while the American investor in gas property, having sunk half his capital in a particular locality, requires to keep the other half in a "war chest" to meet possible enemies, we shall continue to counsel caution to those who may be asked to embark in the same enterprise.

Mr. R. V. S. Houghton, who has been assistant at the Haslingden Union Gas Company's works, has been appointed to the managership vacated by the removal of Mr. W. H. S. Gendall to Bury.

WATER AND SANITARY AFFAIRS.

Our daily contemporaries in the press would hardly be acting up to well-recognized traditions were they to fail from time to time to make an onslaught upon the Metropolitan Water Companies. The "dailies" know what is expected of them in this matter; and, when fresher topics are scarce, they zealously perform their immemorial part. The last of the London papers to draw attention to the water question was the *Echo*—in a recent issue of which it was suggested, without any manifest evidence in support of the suggestion, that the public inerest in the question is evidently growing. We very much doubt whether public interest, in its broad sense, is doing anything of the kind; though doubtless here and there small sections of the community, and ambitious representatives of local interests, manage to make themselves heard upon the subject. It is something, however, to find our own prognostications confirmed as to the probable result of the public inquiry which is to be set on foot in London. "Everyone "knows," says the *Echo*, "what the net result of such in-"quiries generally is. A great deal of time and money is "expended, and at the end we find ourselves no better off "than we were before." With this view, we must express our cordial concurrence. The truth is that there is no general grievance against the Companies, and that the effort to manufacture one, which is renewed from time to time, fails as it must deserve to fail. The *Echo* appears to think that of the many proposals that have been made for supplying a remedy for the "present unsatisfactory "condition of things," that of payment by measure seems to find most favour. But our contemporary does not condescend to details; and the public are left somewhat in the dark as to the class of persons by whom the idea of payment by measurement is so favourably entertained. The *Echo* itself, however, proceeds to indicate, at any rate, that this yearning for a change does not spring from the great mass of the population. Indeed, our contemporary sorrowfully remarks that it is doubtful whether the meter system would be of any advantage in the dwellings of the poorer classes. In truth, there is no doubt (but, rather, a certainty) that the adoption of such a system would lead to a stint of water, and consequently to insanitary habits. The *Echo* is, no doubt, philanthropically averse to increasing the already closely-packed ranks of "the great unwashed." Hence our contemporary's misgivings. But it may be well to point out that its suggestion that the anticipated results may be guarded against by requiring each householder to take a fixed quantity of water before the meter charge came into operation, would make the so-called meter system delusive and incomplete. If there is to be a fixed charge of this sort, the small householder would assuredly find himself in a worse position than he occupies at present. A reluctant confession of the truth of what we say is wrung from the writer in the *Echo*; for he proceeds to admit that it cannot be said that the present basis of payment "inflicts any great hardship upon the "occupiers of houses of low rents. A rate of £1 or 30s. "a year for an unlimited supply of pure water, cannot be "considered an unreasonable charge." Exactly so; and, this fact being acknowledged, it would be monstrous for the Legislature to give encouragement to a small knot of agitators, whose clamour against the Water Companies, while professedly made on public grounds, is in reality only the loud voice of a small, discontented, but wealthy group of water consumers.

Lord Rosebery, in reviewing the year's work of the London County Council from his standpoint as Chairman of that body, made reference last week to the Metropolitan water question, which he characterized as "a very urgent "matter," in respect to the quinquennial valuation to take place next year. On this point, the Chairman cited some figures obviously furnished by Mr. Beal, and which may be taken as a revised version of the statistics referred to in these columns a short time back. We are now informed that "the annual increase in rateable value of "property in London averages about 1½ millions at each "quinquennial valuation." Taking the average authorized charge of the several Companies for domestic supply to be 5 per cent. on rateable value, the increase of

income to the Companies at each quinquennial valuation is reckoned to be £75,000 a year, "solely in respect of "the increased rateable value of existing property." It would seem that the Companies have not found this to be the actual result, as affecting the whole of them. If the nine years 1880-8 be taken, we shall include two quinquennial valuations; and if we do this, we find the net water-rates of the Metropolitan Water Companies rising at the rate of rather less than £36,000 per annum. But during that period the rateable value of the Metropolis increased nearly £782,000 per annum; thus rendering the supposed increase of the water-rates £39,000 per annum. This looks like a tolerably close approximation. But we have to take into account the yearly increase in the population, represented by the addition to the number of houses, and the consequent extension of the water supply. In 1880, the number of houses supplied by the Companies was 588,050; the number in 1888 being 739,901. The net water-rates in 1880 averaged £2·45 per house; and as the houses increased at the average rate of 16,872 per annum within the nine years, there was room for an increase of £41,336 in the net water-rates, or £2000 more than the 5 per cent. on the increased rateable value. We may put the calculation in another form. The net water-rates in 1880 were £1,440,874. In 1888 the houses had increased in number by 151,851; so that the proportionate addition to the net water-rates would be £372,000—making the sum total £1,813,000; whereas the actual income was only £1,728,760. Thus the increase in the net water-rental is more than accounted for by the increase in the number of houses supplied, irrespective of any increase in the rateable value. It may be said we are proving too much. Still, there are the figures, which any critic may test for himself. No doubt there are some corrections to be applied. In the first place, the supply of water per house was not so large in 1888 as in 1880; the daily average falling from 241·78 gallons to 220 gallons. This may be partly accounted for by a more diligent supervision for the prevention of waste; extra care being necessary when the supply is rendered constant—a process which has undergone great extension during the last few years. Another circumstance affecting revenue was the passing of the Water-Rate Definition Act in 1885. A disturbing element in the calculation also arises from the circumstance that the rateable value under consideration does not comprehend the whole of the area covered by the Metropolitan Water Companies. But, after making all due allowance for modifying causes, it is singular that it should prove so difficult to trace a rise in revenue in accordance with rateable value. That there is some such rise cannot be doubted; but investigation seems to show that the Companies—taken in the aggregate—are not so eager to exercise the full extent of their rights as the public are led to suppose. The fact that the domestic supply only extends to little more than three-fourths of the total also has an effect on revenue.

Lord Rosebery sounds a note of alarm, by saying that the increase in the value of the Water Companies' stock at each quinquennial valuation would probably be at least two millions. "They would see from that," said his Lordship, "that it would be, after ten or fifteen years, "impossible for London to face the enormous expense of "controlling its own water supply." This is very like saying that London cannot face the contingency of acting honestly towards a body of investors. It may calm the apprehensions of the County Council, if they will but reflect that ten or fifteen years hence London will be considerably bigger and richer than it now is; and that in all probability the price of the water undertakings will retain the same proportion to the rateable value of the Metropolis that it does now. But Lord Rosebery feels as if the water supply was about to escape for ever from the grasp of the Council; and he encourages the Special Committee on Water Supply "to urge that "a Bill be brought into Parliament to deal with this "question in the interest of the ratepayers and in the "interest of the Metropolis at large." What sort of a Bill this is to be, we are to infer from the preceding remarks, which seek to justify a suspension of the power possessed by the Companies to charge according to the rateable value. The question, we apprehend, bears very unequally on different Companies; but on the whole we cannot see that Lord Rosebery or Mr. Beal need be so much alarmed at the prospect before them. The quinquennial valuation has become a perfect bugbear in the County Council, so far as the water supply is concerned, though it answers very well when the Council levy rates of their own. Why not strike at the root, and stop the valuation?

The Lymm (Cheshire) Local Board, at their meeting last Thursday, increased the salary of Mr. Arthur Graham, the Manager of the gas-works, by 20 guineas per annum, in consequence of the good results of the past year's working.

Mr. Thomas Wilkinson, for the past 15 years Manager and Secretary of the Victoria (Newmarket) Gaslight Company, resigns his appointment as from the 14th prox. Mr. Wilkinson's nephew, Mr. J. H. Troughton, has been appointed his successor.

Manchester District Institution of Gas Engineers.—The Committee have determined, in consequence of the last Saturday in this month (the usual day for the annual excursion) being in Whit-week, to hold the next meeting a fortnight earlier—viz., on the 17th inst. Matlock Bridge is the place selected for the visit, full particulars of which will be duly announced.

An Electric Light Company's Manager Charged with Manslaughter.—According to a Dalziel's telegram from New York, the trial of Mr. Charles Pierce, Manager of the lamps of the Brush Electric Light Company, on a charge of manslaughter, was concluded last Wednesday. The evidence showed that the fall of the electric wire across Eighth Avenue, which resulted in a man's death recently, was purely accidental, and Mr. Pierce was acquitted.

The Forthcoming Meeting of The Gas Institute at Ryde.—A public meeting was held last Wednesday afternoon at the Town Hall, Ryde, for the purpose of considering what steps should be taken on the occasion of the annual meeting of The Gas Institute next month. The Mayor (Alderman Barton), who occupied the chair, said it was thought in Committee of Council that they should give these gas engineers a hearty welcome, as it must be a means of benefiting the town. It was merely a question as to how they should proceed. There was the precedent of 1881, when they had the Medical Association in the town; and he thought a similar programme might be carried out. Mr. R. Colenutt moved—"That in the opinion of this meeting it is desirable that a Committee be formed to suitably entertain the engineers of The Gas Institute on their approaching visit to the borough." Mr. Fowler seconded the motion, and it was carried unanimously. An influential Committee was appointed, with power to add to their number.

Pipes and Pipe Joints.—At the last meeting of the Birmingham Engineering Society, Mr. Knight read a paper on "The Use of Cast and Wrought Iron for Pipes, and the Relative Advantages of the Two Materials," especially as affected by the various practical considerations of original cost, strength, expense of transport, &c. He pointed out why a heavy cheap material like cast iron, which is almost invariably used for such work in this country, is altogether unsuitable when the pipes have to be transported to great distances, and probably submitted to much rough usage and great risks of fracture. Mr. R. Pierce followed by reading a paper on "The Use of Steel for Making Pipe Mains." He described the various processes of making riveted and welded pipes from steel plates; forming the sockets and collars on the pipes, &c.; and pointed out the qualities of the steel necessary to ensure success when the pipes were made with welded joints. Mr. T. Arnall then read a paper on "The Joints Used for Various Kinds of Work, and the Testing of the Pipes at the Works of the Manufacturer and after they are laid in the Trenches." The three papers were taken as one, and the reading of them was followed by a long discussion.

Sulphur Compounds in Crude Petroleum.—In a recent number of the *Bericht der Deutschen Chemischen Gesellschaft*, Messrs. C. F. Mabery and A. W. Smith have contributed a note on the results of their investigation into the sulphur compounds of the crude petroleum from the Ohio field. They find that on fractionating the crude oil, the sulphur compounds collect in the portion boiling between 200° and 300° C., and that they can be easily separated from this fraction by the addition of concentrated sulphuric acid. From this acid solution, after neutralizing with lead carbonate or lime, the compounds separate on warming. They appear to be very unstable; but when the aqueous solution is distilled, a yellow oil collects in the distillate, which contains 14·97 per cent. of sulphur. When they attempted to distil the oil, it decomposed, evolving sulphuretted hydrogen. Under diminished pressure, the oil was fractionated into portions which on being tested, did not contain thiophene or mercaptan compounds, but consisted of various organic sulphides. The portions having the lowest boiling-point yielded on distillation a hydrocarbon forming a bromine compound of the formula $C_{17}H_{14}Br_2$. By the addition of alcoholic mercuric chloride, they also succeeded in isolating the double compounds of methyl, ethyl, and propyl sulphides, and obtained indications of the presence of butyl sulphide.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 831.

The past week has been a bright one in the Stock Markets. Every department has been active, and prices have risen gaily. Money was in abundant supply, and the general outlook all round was favourable; so that there was every reason for buoyancy. In the Gas Market, transactions have been much more restricted—a feature which we are inclined to attribute to a great extent to the favourable tendency itself. There are probably many more buyers in the market than sellers; and the supply of stock is quite inadequate to the demand. In fact, Gas stands very well just now, and is likely to be better. So far from there being any electric scare, the boot is on the other leg; and an uncomfortable feeling is beginning to obtain as to the probable ratio of performance to promise of the electricians. From New York comes the intelligence of the reinstatement of the "old reliable" for public lighting; and at home people are wondering when the big projects that made such a cackle some time ago are going to lay an egg. Gaslight "A" shows no change; having been lightly dealt in, at pretty level figures, throughout the week. But the debenture and preference stocks are in demand (first-class investments being still much wanted), and the former have risen considerably. South Metropolitans have been very quiet and firm; the debenture stock fetching top price. One transaction in Commercial old (which is 2 higher) is all the record; stock being very scarce. Suburbans and Provincials would be quite a blank, but for one deal in British and one in Crystal Palace—business in which is coming more into evidence. The Foreign companies furnish the only case of retrogression; Imperial Continental having receded 1, on profit realizations. All the rest are firm, especially Continental Union; while Bombay and San Paulo are higher. Water has been a quiet market, but firm. Business was mostly in East London, which shows an advance of 2. Southwark and Vauxhall "D" are 1 higher.

The daily operations were: At the opening on Monday, Gas was firm, but remained very quiet all day. The best prices were realized by Gaslight 4 per cent. debenture stock. Quotations closed without change. Nothing in Water was operated on except East London, which showed a favourable tendency. There was no increase in activity on Tuesday, but the firm disposition continued. Gaslight 4½ per cent. debentures rose 3; ditto, 4 per cent., 2; and Commercial old, 2. Water was quiet and steady; Southwark "D" rising 1. On Wednesday, Gas well maintained its strong position, though quotations did not rise, and several issues realized top prices. Water was unchanged. Thursday, being the first of May, was an annual holiday. The re-opening on Friday brought with it some promise of greater activity; and prices were good all round, except for Imperial Continental, which was easier. San Paulo improved ½; and both Bombays, ¼ each. Business in Water was mostly in Grand Junction, at good average figures. East London advanced 1. On Saturday, Imperial Continental fell 1. Gaslight "A" was irregular; ranging from 248½ to 251—the closing mark. The only feature in Water was a further rise of 1 in East London.

ELECTRIC LIGHTING MEMORANDA.

Electric Lighting in New York Streets—The Affairs of the Deptford Undertaking—A Scotch Amendment of the Electric Lighting Acts.

The report of the Superintendent of Lamps and Gas for the City of New York, which was briefly noticed in the Journal for the 15th ult., contains much reading that cannot be considered pleasant for American electricians or their admirers in this country. The assertion, heard whenever electricians want anything of a British local authority, that electric lighting of public streets is much more advanced on the other side of the Atlantic, has often been dealt with in these pages; but the imposition is so frequently repeated that we are bound to persistently collect fresh facts wherewith to expose it. Superintendent M'Cormick has plenty to say in this report which bears out our contention, that if there has been more electric lighting in the streets of New York and other cities of the United States than hitherto in the towns of the United Kingdom, it is simply due to the greater indifference of the American local authorities and citizens to the quality of the lighting. The New York authorities have awakened at last to a sense of the shortcomings of the local electric lighting companies, and have taken sweeping measures of revenge; but this tardy action does not affect our argument that if American town authorities had only been more solicitous from the beginning that those whom they represented should be fairly treated by electric lighting contractors, the latter would not have been able to make such a show. In the course of his remarks, which expose the manner in which electric lighting has been favoured and gas placed at a disadvantage in New York, Mr. M'Cormick says that "the lighting of our streets and public places by electric lights during the past year has been bad in the extreme; and the people have doubtless been greatly inconvenienced thereby. On three different occasions portions of our city have been shrouded in darkness in consequence of the extinguishments of the electric lights. In addition to the above-mentioned extinguishments, the police reports show that very many electric lamps have been found not lighted during the year, the extinguishments lasting from ten to fifteen minutes to all night in various parts of the city; in some cases entire circuits have been temporarily shut off in consequence of some defect at the generating station." In some cases the extinguished lamps were supplied from underground, as well as from over-head wires. Quite pathetically, the Superintendent observes that during the sixty years in which New York has been lighted by gas, the street lamps have never been extinguished, with the exception of one occasion where a few of the up-town streets were not lighted for one night. Evidently, now that electric lighting has "come to stay," as the Superintendent would probably express it, he does not look for any such peaceful and secure times to return.

The *Electrical Review* for the 25th ult. was painfully candid with regard to the position and prospects of the London Electric Supply Corporation. First quoting from that "faithful and honest guide" for investors, the *Financial News*, a prophesy dated Oct. 24, 1888, of the immediate triumph of this Corporation in their task of supplying electricity for all London from the Deptford station, the *Review* brutally remarks that after the lapse of eighteen months the grand success in question is as far off as ever. It is generally understood that there is something very wrong indeed with the Deptford plant; but whether the plans of the Corporation for distributing electricity under high pressure have wholly collapsed, or are only temporarily delayed in fulfilment, nobody seems to know. The Earl of Crawford has gracefully retired from the chairmanship of the concern, and Mr. J. S. Forbes has taken his place; but although Directors come and go and change places, the big engines and dynamos of which so much has been heard keep still, and the huge chimneys of the station—a new landmark on the Deptford shore—remain cold. Sooner or later the truth must be told, no doubt; but Mr. Forbes is too old a hand to tell an unpleasant tale one moment before disclosure becomes inevitable.

The Lord Advocate and other Government officials have brought in a much-needed Bill to amend the Electric Lighting Acts 1882 and 1888. In the schedules of these Acts defining the local authorities affected, a troublesome blunder was made with regard to the definition of Scottish local authorities, which escaped notice until some of these bodies attempted to take advantage of the Act and obtain electric lighting Licenses. It was then found that the relative positions of police commissioners, gas commissioners, and town councils had inadvertently been transposed. The gas commissioners were evidently intended to benefit by the Acts, on behalf of the localities possessing such bodies; but it was discovered when too late that the only powers for supply under the Acts were given to police commissioners, where these existed, though they might in point of fact be consumers of gas supplied by their colleagues of the gas commission. The constitution of Scottish local governing bodies is so peculiar that a mistake of the kind described is not altogether to be wondered at; and the method of getting out of the difficulty propounded by the Lord Advocate is a testimony to the intricate character of the arrangements affected by it. It is proposed by the Bill that where gas commissioners exist in any town council or police commissioners' district, the latter may appoint the former to be the local authority for the district for the purposes of the principal Acts. Such appointment is not to be made without the consent of the gas commissioners, which consent they are to be authorized to give after special meetings by both parties. A clause is added to save the session or pending proceedings under the principal Acts in which notices may have been served on or by the wrong bodies. The Bill does not contain anything else, and is of purely local importance.

Restricting the Use of Saccharin.—The Portuguese Government have decreed that saccharin, whether alone or mixed with any other product, shall be sold by chemists only on the prescription of a legally qualified medical man. Every contravention of this enactment, as well as the employment of saccharin in the manufacture of sweetmeats and drinks, is made punishable by definite penalties.

The Petitions for a Royal Commission on the Salford Gas Scandal.—In the House of Commons yesterday afternoon, Mr. Summers asked the First Lord of the Treasury whether the attention of the Government had been called to the petitions of the Salford Corporation, and of the ratepayers of Salford, praying that a Commission should be appointed to inquire into the alleged fraudulent transactions in connection with the Corporation contracts; and whether it was the intention of the Government to accede to the prayer of the petitioners. Mr. W. H. Smith replied that it was not in the power of the Government to appoint a Commission with the necessary powers to examine witnesses on oath. Legislation was required; and it was for hon. members interested in the question, and who thought it was necessary, to introduce the Bill. It was not the duty of the Government to take the initiative in a question of this kind.

HENRY PALFREY STEPHENSON.

ANOTHER link connecting the past history of the gas industry with the present has been severed. After many years of suffering, Mr. Henry Palfrey Stephenson, M. Inst. C.E., has gone to his final rest at the age of 64. His death occurred last Wednesday, at his residence, "The Hermitage," Duppas Hill, Croydon—a house which, during the eight years he has been an invalid, the Directors and Engineers of several of the Companies in which the deceased gentleman was interested have been wont to visit, to obtain that counsel which, from his long, ripe, and varied experience, he was able to, and did willingly and freely, afford.

Mr. Stephenson was born in 1826, at Portobello, near Edinburgh; his father being in the Sixth Dragoon Guards, then stationed at that place. But the first years of his life were passed in Ireland; and he resided afterwards to the age of fourteen at Cheltenham and Boscombe, near Bournemouth. He was educated at a private school; and in the forties, he spent five years (from about 1842 to 1847) at the College of Civil Engineers at Putney, where Mr. Robert King, the Secretary of the Singapore Gas Company, was a contemporary of his. This college (not now in existence) supplied the basis of the present flourishing Society of Engineers, of which Mr. Stephenson might aptly be termed "the father," he having being one of its founders and the President as early as 1859. After leaving the Putney College, he was engaged on the Irish railways, which at that time created such a stir in financial and engineering circles. Subsequently (about the year 1849) he was employed at the Sunderland Docks, under the Engineer, the late Mr. John Murray, C.E.; and it was during his residence in this busy shipping town that he became acquainted with the lady who, in 1853, became his wife, and who survives him. In 1850, Mr. Stephenson entered into business with Mr. W. Dredge, C.E., but the partnership was not of long duration. He then devoted himself to private practice; and one of his first pupils was Mr. Charles Gandon, Engineer of the Crystal Palace District Gas Company. It is interesting to note, in passing, how during the three decades which have elapsed, the business lives of these two gentlemen have continued to mingle.

From the foregoing, it will have been gathered that Mr. Stephenson's training essentially fitted him for a dock and railway engineer; and it was in this capacity that he entered into private business. Among other work which occupied his attention about this time, was the designing (in conjunction with his old fellow-collegian, Mr. Robert King) of several iron bridges for Singapore and other places. It was in the fifties that Mr. Stephenson drifted into the gas profession. With that clear perspicacity which marked his whole career, he saw that the then rising gas industry would, before the lapse of many years, assume vast proportions, and that his time and money could be usefully and profitably spent and invested in connection therewith. With Mr. Gandon as his assistant, in 1858 and 1859 he constructed, among other gas-works, those at Naumburg, Ludwigsburg, Zeitz, and Tilsit, in Germany; and the certificates which he obtained from the ruling authorities or companies in those towns—showing that the works were well and substantially built—have been carefully preserved by him, and will continue to be preserved with no less care by the family.

A large number of gas companies have materially benefited by having Mr. Stephenson either as a Director or Consulting Engineer; and perhaps no man living can lay claim to having served in the former capacity to the extent Mr. Stephenson has done. He was (previous to his retirement about eight years ago on account of ill-health) a member of the Boards of the Bahia, Bombay, Singapore, Georgetown, Cagliari, and Pará Gas Companies; and until the day of his death, of the Crystal Palace District and Croydon Companies. He was connected with the Singapore Gas Company from its origination; and was the head of the Board from 1862 to 1882, to which position, on his resignation, the present Chairman (Mr. R. S. Foreman) succeeded. With regard to the Crystal Palace Gas Company, he was associated with Sir Erasmus Wilson and other gentlemen in its promotion. The first general meeting of the Company was held in March, 1855. December of that year witnessed the commencement of the long and faithful service to the Company of Mr. Magnus Ohren; and as he was engaged in all the early struggles of the concern, we cannot do better than reproduce a portion of a letter we have received from him in regard to Mr. Stephenson's connection with it. He writes: "The first meeting to form the Company was held on Dec. 19, 1853; and from that day to within a few days of his death, Mr. Stephenson's untiring energies were devoted to the prosperity of the Company, and especially to the foundation laid by him in the infancy of the Company—never tiring until he established it in strong manhood. His health had been failing for a long time. But he had no failing of brain power; and although for the last few months he was not able to attend the Board meetings, a copy of the minutes was always sent to him, so that he kept in touch with the Company's affairs, and he was always ready and willing to give his views and assistance to his brother-Directors on all occasions. He died at the comparatively early age of 64, regretted by all his friends." It may be added that for many years Mr. Stephenson was the Chairman of the Company; and the last time he appeared in that *rôle* at the half-yearly meeting of shareholders was on March 23, 1888. At that same meeting, he was one of the out-going Directors; and the then Deputy-Chairman, Mr. Frederic Lane Linging (who for the past two years has filled the chair), in the course of his remarks in moving his re-election, observed: "Mr. Stephenson, as he has told you, has been connected with the Company for 35 years; but he has not told you that, when he joined the Company, it was surrounded by enemies, and men who did not care for the interests of the Company, but only for their own interests. By those business qualifications and that determination which were characteristic of him, Mr. Stephenson got rid of the incubus, and placed the Company on a sure foundation. He has carried on the destinies of the Company to the present time, with what result you all know." Mr. Stephenson was appointed a Director of the Croydon Commercial Gas and Coke Company in 1879. As recently as Feb. 19 last he retired from the office by rotation; and although it was announced that he could seldom attend the Board meetings, the shareholders showed the measure of confidence they reposed in him by re-electing him without a single dissentient. The deep interest which he took in gas matters up to the day of his death is evidenced by the fact that, whenever it was possible for him to be wheeled out in his bath-chair, he invariably desired to be first taken round the works of this Company, which are situated only a short distance from his house.

We believe that Mr. Stephenson was one of the first—if not the first gas engineer to be elected a member of the Institution of Civil Engineers. He was admitted as an Associate in May, 1853; and was raised to membership on Feb. 23, 1864. One noteworthy incident in his life may here be recalled to mind. It was mainly by the active part he took in the investigations in the famous Sombrero case that the rights of the shareholders were established, and their money recovered. For his exertions in this matter, he was presented with a handsome testimonial. As a matter of historical interest, it may also be mentioned that Mr. Stephenson acted as Consulting Engineer in the erection of Cleopatra's needle on the Thames Embankment. The work which he most delighted in was in preparing and giving evidence in arbitration cases, and in inquiries before Parliamentary Committees; and it was his intention, had his health been maintained, to devote himself almost exclusively to that class of practice. Of Mr. Stephenson it may, in conclusion, be truly said that he was one of the most courteous and benevolent of men, and ever ready to proffer his advice where needed.

The funeral service took place shortly after mid day on Saturday last at the Croydon Parish Church, and the interment at Brompton Cemetery later in the afternoon.

Mr. Andrew Ross, of Warrenpoint, has been selected by the Directors of the Cookstown (Co. Tyrone) Gas Company, as Manager of their works. Mr. Ross—who is son of Mr. R. Ross, of Dungannon—has been three years in Warrenpoint, where he has discharged his duties to the entire satisfaction of the Directors and the public. He has remodelled the works on the most modern principles, and leaves them in a highly satisfactory state.

Electric Lighting in Berlin.—A remarkable decision has just been arrived at by the Municipal Council of Berlin, regarding the electric lighting of the famous Avenue, Unterden Linden. Explanations were asked in reference to the interruption in the electric lighting, and as to what action would be taken to remedy the defects. The reply given was that the interruptions were frequently due to abnormal atmospheric conditions, which it was impossible to foresee; and that the General Electrical Company had endeavoured to ensure efficient illumination. The Municipal Council, being dissatisfied in the matter, have, however, arranged for a gas service along the Avenue as a stand-by. All gas-lamps not absolutely required will be removed by, and at the cost of, the Electrical Company; and this will also be the case for the lighting and extinguishing of the lamps left in the Avenue. The gas-lamps will be repaired and maintained (including the daily cleaning) by the Gas Company, at the cost of the Electrical Company; and this will cost more than £4000 per annum. In the public interest, the control of the defective electric lamps will be in the hands of a gas employee, whose wages the Electrical Company will have to pay. In case the arc lamps should fail, the Company must pay a fine of 4½d. per lamp per hour; but gas, if necessary, will be supplied, free of charge. The Electrical Company have been obliged to pay £75 for failures in the service up to the 1st ult., and for the maintenance of gas-lamps used when the arc lamps have become extinguished. This is not the first time that the Electrical Company have been in disgrace as to the lighting of the Unter den Linden. The Avenue has been electrically lighted for some years; and now that the service has become so defective, gas has again had to be partly resorted to. Some few months ago, the 2000-candle power arc lamps used in the Avenue were stated to only give 500-candle power; but this assertion caused inquiries to be made, and the result of a series of tests showed that the average intensity of the lamps is really only 641 candles.

GAS-BURNERS FOR ILLUMINATING PURPOSES.

A PROMINENT American Gas Manager who recently visited this country, and of course extended his peregrinations to the Continent, was heard to remark, with special reference to burners and other appliances for the utilization of gas, that there was nothing new in the market. We believe that this verdict is in the main correct. There has been a fair amount of effort resulting in new developments in gas engineering, as we have lately had occasion to recognize; but consumers' apparatus has made little or no advance for several years. In the lighting branch, it is evident that if a comprehensive gas appliances exhibition were to be held this year, it would present hardly anything that could, by the greatest stretch of courtesy, be deemed a novelty. The great class of common open burners, whereby the mass of gas consumers obtain their light, remains absolutely without change, as it has done for these ten years and more. It would appear as though invention can do no more for these humble yet most useful productions; and that, like the billhook of the Saxon churl, the union-jet and the batwing burner have reached their utmost development, which they will keep for the remainder of time. If we turn to the more specialized and differentiated patterns of gas-burners, in which (to follow Spencer) change will be more likely than in elementary forms, it is difficult to mark any notable advance. The principle of heat recuperation for the enhancement of the luminous brilliancy has been worked out with tolerable completeness by Mr. Frederick Siemens and his followers and rivals, several of whom appear to have a better appreciation of the requirements of the market than their prototype. There has been much refinement of detail and improvement of pattern in the modern competitive production of recuperative gas-lamps; but it would be next to impossible to discriminate in print between the different makes, with a view to distinguishing the best. Some makers aim only at cheapness; others cultivate taste. Others again profess to observe efficiency and economy in use. Infinitesimal divergencies of construction are exaggerated by rival makers into important differences; but, fortunately for themselves, these competitors seem to be wholesomely afraid of taking their conflicting claims into Court. The history of gas-burner patents' litigation is not encouraging to a trader who might otherwise be disposed to shift the scene of his struggle with a rival from the shop-counter to the Law Courts. So far as can be determined by a spectator, the competition between makers of the most improved forms of recuperative gas-lamps, although keen enough, is conducted on commercial grounds alone. Whether there is much to choose between them, is not for us to say. Suffice it to acknowledge with satisfaction, out of regard to the general interest of the gas industry, that consumers have now at command a considerable choice of really scientifically made and truly efficient gas-lamps, such as could not have been bought at any price only ten years ago.

Assuming, however, that the adoption of the regenerative principle for gas-lamps has led to a great advance in their construction, which has been of vast benefit both to the industry and to the community, it must still be somewhat disappointing that, to all intents and purposes, a halt has been so soon called in the development of this class of lamps. The huge furnaces consuming 50 cubic feet of gas per hour and upwards, which were common enough on offer when the first makers of these lamps essayed to compete with electric arc lamps, have disappeared. Very few of such gas-lamps now in active service take upwards of 20 cubic feet per hour; while the great majority in ordinary use are only half as large as this, or are even smaller. This change is in correspondence with the failing popularity of the electric arc itself, which is now perceived to be unmanageably powerful. It has been found that what the majority of consumers wanted for their warehouses, shops, &c., was an improvement on the amount and quality of the light obtainable from their ordinary gas-burners, and not such a radical change of system in lighting as would have been entailed by the general introduction of light centres comparable to the electric arc in intensity. This improvement has been effected by the recuperative gas-lamp of moderate power, and by the albo-carbon system of carburetting, which is the only thing of the kind that has really become established in public favour. Hence we see to-day, in passing through a street of a good class in any British town, few shops which are not rendered more brilliant and attractive by one or other of these methods of improved gas-lighting. The white flame of albo-carbon burners seems to be peculiarly effective for shop windows in which cloths and similarly non-reflecting goods are displayed. A tailor's shop is as difficult to render cheerful as a photometer room; and for the same reason. It is necessary therefore that the means of lighting should be placed in close proximity to the cloth which it is intended to exhibit; and nothing surpasses the albo-carbon burner for this purpose. Regenerative lamps must be placed overhead and well out of the line of sight.

It is evident, without dissertation on the point, that the great gulf between the cheap and open flat-flame burner—and even the refined Argand—and the close, costly recuperative burner is as wide as ever. Even if everybody could afford recuperative lamps, there are many purposes for which they are not so suitable as the less efficient form. The Argand, beloved of writers and readers, may sometimes be replaced by the ceiling lamp, or the suspended regenerative lamp of small power; but the radiated heat of the latter is a distinct drawback. It is the increased heat in and surrounding the closed regenerative flame which makes it so much more brilliant than an open burner; but, although the average consumer may be made to believe this, he will none the less complain that the lamp does not keep its excessive heat to itself instead of pouring it on his head. The heat of a gas-flame used for lighting an apartment is the same whether the gas is burnt in a lamp glass or in the open. But in the latter case much is taken off by convection, and spent up towards the ceiling, which the regenerative lamp converts into radiant heat that strikes the nearest solid object, whether it be the consumer's head or his walls and furniture. In fact, the regenerative gas-burner is the best of all known gas-heating stoves. We do not, however, want a stove for warming our heads, even though it sends light to our eyes.

The only other practicable kind of gas-burners—the incandescent varieties—do not enter largely into the general question. It cannot be argued that they have justified the expectations indulged of them by some people, although it would be too harsh to say that the idea has proved a failure. The difficulty with this order of gas-burners is of two kinds. In the first place, it is to supply a material solid and bulky enough to give a good light when strongly heated; and at the same time to present it to the gas-flame in such a tenuous or comminuted state that it will readily become white-hot. According to the generally accepted theory of the luminosity of flames—which ascribes this phenomenon to the presence in the highly heated gas of a vast number of particles of solid carbon—anything to surpass this carbon in facility of becoming heated, in fineness of division, and in radiant power when heated, must be hard to find. The makers of incandescent gas-lamps profess, however, to have found this desiderated matter in the substances of which their "mantles," or "combs," or "meshes" are made. They are never so cheap as carbon, because carbon is one of the very cheapest of elements. In the ordinary way of burning coal gas, moreover, for illuminating purposes, the carbon which gives the light is supplied fresh as fast as required; whereas an extraneous radiant material has to serve for a longer or shorter time until worn out. Even the manufacturers admit that this material loses its efficiency in use, and sooner or later requires to be replaced. The precise point when this occurs is a cause of dissension between the manufacturers of these lamps and their customers; and upon it the whole question of the commercial efficiency of these systems turns. On the whole, we cannot accept as proved the contention that the laboratory efficiency of any incandescent burner, as tested with fresh radiating material, is maintained by its commercial durability.

Thus after passing in review the three orders of gas-lighting burners—the open flame, the regenerative, and the incandescent—we cannot signalize any new departure in the utilization of gas for illuminating purposes later than the introduction of the two latter systems. Opinions may differ as to when this took place; and it is hardly worth while to attempt in this article to fix the exact time, which would be tantamount to an acknowledgment of the claims of some particular inventor. It is curious that a period of such activity in this respect as that which ushered in the last decade, should have been followed by such a pause. It is not that there has been indolence on the part of those who are identified with any of the recognized systems. Indeed, never since gas-lighting came into vogue has the activity of burner-makers been more conspicuous and more fruitful than during the last eight or ten years. The extent to which the knowledge of good and bad in regard to gas-burners has been disseminated during this period, although by no means completely to the conviction of consumers, has been greatly in excess of previous years; and it is not too much to say that, in consequence, the average consumer now gets a great deal more for his money than did his predecessor of the last generation, who perhaps paid twice as much as the present rates for his gas. Outside the established trade, however, there has been nothing doing for years. Siemens, Wenham, Welsbach, and Lewis were outsiders once. Are there never to be any more innovators, with fresh systems of gas-burner construction? All that can be said in answer to this question is that it is a dull time at present, and has been so for some years. Yet, unless one is to accept the conclusion that the last word has been said respecting the best way to develop the illuminating power of gas, it follows that there must be plenty of room for the next inventor in this line, whoever he may be.

The Accounts of the Metropolitan Gas Companies for the year 1889—presented to Parliament on the 15th ult., and ordered to be printed—were issued to members of both Houses on Thursday last.

Liverpool Engineering Society.—After the adjourned discussion of the paper on the "Efficiency of Gas-Engines," by Mr. Thos. L. Miller (*ante*, p. 788), which takes place at the next meeting, the present session of this Society will be closed. At the last meeting, Mr. F. Hudleston, Assoc. M. Inst. C.E., was elected President for the ensuing year. Arrangements are being made for the summer excursion to the Manchester Water-Works in course of construction at Thirlmere, the Forth Bridge, the works of the Liverpool Electric Supply Company, and to other places of interest.

NOTES.

The Amount of Light Available in and out of Doors.

The accurate quantitative determination of illumination—*i.e.*, the measurement of the amount of light actually received by surfaces in different localities—is something altogether disconnected from ordinary photometry, or the direct comparison of light sources. Yet for most practical purposes the degree of lighting actually available in any locality occupied by human beings, is more important than the statement of the brilliancy of the sources of light employed to illuminate it. One of the most remarkable considerations concerning artificial lighting is the power of adaptation displayed by the human organism in the matter of accepting such light as for practical purposes an equivalent for daylight, which is so immeasurably brighter. It is probable that the amount of the difference between daylight and artificial light rarely strikes the people who, in the ordinary way, when daylight fails, light up their gas-burners and lamps, and carry on their occupations as readily by the one style of light as by the other. Yet a little investigation of the amount of light received by an indicating surface, such as that of a sensitive film in a photographic camera, shows how greatly localities differ in this respect. Even by day this difference is remarkable as between outdoors and within houses and workshops regarded as fairly light. For a view at the sea shore, comprising sea and sky mainly, a certain plate would require an exposure of (say) one-tenth of a second. An open landscape away from the sea would, under equal conditions, require an exposure of one-third of a second. A fairly lighted interior would require 2½ minutes, while half an hour would not be too long to complete a picture in a shaded room such as many people prefer for writing and working. According to this effect, it is computed that the sea-shore light is 18,000 times stronger than what is called daylight in the ordinary shaded and curtained rooms of a town house. The comparison with artificial light has not been made; but although photography is commonly practised by the aid of electric and gas lamps, these are generally disposed for the purpose in a special fashion, and consequently do not facilitate the comparison between the amount of light in the artificially illuminated interior and that of diffused daylight.

The Sutherland and Allen-Harris Gas Processes.

A recent number of the *American Manufacturer* contains a description of the Sutherland and Allen-Harris processes for making illuminating and fuel gas from oil and water. The former is described as a low-temperature process for gasifying petroleum, with a view to avoiding the loss of material appearing as deposited carbon when large and very hot retorts are employed for this purpose. The apparatus employed comprises a number of iron tube retorts, 3 inches in diameter, ranged in tiers resting upon fire-clay tiles built on both sides of a simple furnace; the whole being contained in a fire-brick setting. Oil and steam, the latter dried by passing through a superheater, are admitted into these pipes, which are maintained at a red heat. The steam-pipe is inserted into one end of the tube retort, and there reduced to an orifice of $\frac{1}{32}$ inch diameter. The oil and steam together pass through four tubes, connected together so as to form a flat coil on each side of the furnace. In order to improve the contact of the vapours with the heated metal, the tube retorts contain a flat iron ribbon twisted like a screw auger. It is stated that "after the long travel of the hydrocarbon vapours and steam, they become thoroughly gasified"—what meanwhile becomes of the iron retorts is not mentioned, but may easily be imagined. The foregoing, however, is a description of a small plant. For a gas-works of any magnitude, the Sutherland apparatus is combined with the Allen-Harris plant as follows:—The iron tubes are replaced by fire-clay blocks pierced with small holes, still provided with the auger-like device, in which the oil is to be gasified. These retorts occupy the upper portion of a fire-brick arch, and under them are retorts for making water gas. The retorts are horizontal, with a double bottom provided with perforations, through which steam is intended to pass into the body of incandescent fuel in the retort, and be converted into water gas for mixing with the oil gas produced by the upper tubular retorts. The cost of making illuminating gas of, say, 22-candle power by this process, with oil at 2·1 c. per gallon and coal at $4 per ton (the prices stated to prevail in New York), is given as 27 c. per 1000 cubic feet. The apparatus is described here as an American "notion;" for to a gas engineer it appears to combine all the faults that an oil and water gas-making arrangement can present.

The Southern District Association of Gas Engineers and Managers will hold their annual out-meeting next Thursday; the day's proceedings beginning with an inspection of the Richmond Gas-Works at 11 a.m. After luncheon, the party will start (at 1.45 p.m.) from Richmond Station for Hampton Wick, where, at 2.20 p.m., steam-launches will be in readiness to proceed up the river as far as Staines. Here "high tea" will be served, at the Pack Horse Hotel, at 6 o'clock. The return journey will be made by train. If the weather be only fine, this should prove a very pleasant excursion.

COMMUNICATED ARTICLE.

THE CHEMISTRY OF ILLUMINATING GAS.

By Norton H. Humphrys, Assoc. M. Inst. C.E., F.C.S.

XL.

In considering the question of making gas from tar, it is first necessary to specify whether this question is to be approached in a direct manner—treating the tar as a *bond fide* gas-producing material, or in an indirect manner, as is exemplified by processes that aim at increasing the yield of gas obtained by destructive distillation, at the expense of the tar. At a very early stage in the history of our industry, experiments were tried by Clegg and others as to the possibility of returning the tar, or a portion of it, into the ordinary coal-gas retort. Inventors in connection with water gas processes have tried a large number of experiments based upon the principle of gasifying the tar by means of a current of superheated steam. And we must also include schemes such as those of Lowe, who thought to improve the yield and quality of the gas by causing the first half of the products from a charge of coal to pass over and rise with the second half of those from a previous charge; of Laming and Evans, who passed the vapours of tar, &c., through an ordinary coal-gas retort in operation; of Dr. Eveleigh, who distilled coke at low temperatures, thus securing a large yield of thin tar, which was to be converted into gas and pitch by a subsequent distillation; of Mr. George E. Davis, who proposed to obtain a similar result by subjecting tar to distillation, returning the lighter portions to the retorts, and reserving those that were too heavy for gasification, for disposal in other ways; and the Dinsmore process, in which the crude gas from the retorts is caused to pass through a red-hot "duct" before proceeding to the ascension-pipe and hydraulic, with the result that about a third of the tar is converted into gas. The idea of making gas from tar appears to recur every few years, like the spots on the sun. Probably no other process has been so frequently introduced as a novelty, by inventors apparently ignorant that a similar thing had ever been tried before. As far back as 1853 a Mr. Adams, of New York, issued a pamphlet describing the advantages that would follow the adoption of his "process" for making gas from tar; the said "process" including no special apparatus, and apparently consisting of nothing further than the returning of the tar to the retort "at any desired stage of the distillation." He claimed that 12 cubic feet of high-quality gas could be obtained from one pound of tar, and argued that therefore the average product of tar from one ton of coal—which might be put down at 10 gallons—would afford 1300 cubic feet of gas, and thus that the total yield per ton of coal would be increased to the extent of 10 or 12 per cent. The figures advanced in this pamphlet were reviewed by Mr. Lewis Thompson.*

The difficulties in the way of making gas from tar have been set out by Mr. Burns, of Leith, as follows:—"Where it is attempted to decompose tar and make illuminating gas from it, by running the tar into a red-hot retort in the manner adopted for making gas from oil, the tar soon chokes the exit pipes, and a great portion flies off in the form of condensible vapours; and only a small percentage of tar is converted into gas by this means. The cause of the tar choking the pipes, while oil distilled under similar circumstances does not do so, is that tar contains a large percentage of solid impalpable carbon in suspension, which is driven off by the heat of the retort, and carried along with the gas into the pipes, where the solid particles of carbon quickly adhere to the pipes and choke them. Oil holds no carbon in suspension, and therefore can carry no solid particles into the pipes. It is therefore evident that if we wish to convert tar into permanent illuminating gas, we must first either deprive it of its suspended carbon, or employ some means of dissolving the suspended carbon before we can convert the tar into permanent gas. The simplest method of separating the suspended carbon from tar is to distil it at low temperatures, and condense the vapours, which will give oil quite free from suspended carbon; and the oil can then be converted into gas of a high illuminating power by the usual method adopted for making oil gas. But it would not pay commercially to make gas by that method, because we only get 50 per cent. of oil from the tar, and the expense of fuel and labour in first distilling the tar and then converting the oil into gas, would be so great that it could not come into competition with coal gas. There is another method of converting the volatile vapour of tar into gas. Instead of condensing it as liquid oil, we can pass the vapour through a separate decomposing retort kept at a red heat, which would convert the tar vapours into permanent gas. By that method we save a considerable quantity of fuel; but it would not answer commercially, because the heat that would be sufficient to convert into gas the first fraction of the volatile vapours that were distilled off, would not be sufficient to decompose the dense vapours that follow after the first and second fractions, and they would again be condensed into heavy liquid oil. And if we were to raise the temperature of the decomposing retort high enough to decompose the dense vapours, such a heat would completely decarbonize the light vapours and

* See JOURNAL, Vol. III., p. 155.

render the gas useless for illuminating purposes, though it would have high heating power." He goes on to show that by distilling the tar to dryness at a high temperature, with the addition of superheated steam, and passing the products through a red-hot tube, he can produce gas of high or medium illuminating quality as may be desired. The result of this procedure would be simply a carburetted water gas. The steam admitted would be decomposed, its oxygen combining with the carbon contained in the residue from the tar; and the rich gases resulting from the decomposition of the lighter portions of the tar would be diluted with water gas, to an extent proportioned to the quantity of steam admitted. Unless sufficient steam was used to secure the complete combination of the carbon in the form of carbonic oxide, a residue would accumulate in the retort. So this method of dealing with the tar would be influenced to some extent by the questions of specific gravity and poisonous properties of the resulting gas. The operator is thrown upon either of two horns of a dilemma. If he converts the whole of the carbon residue into gas by the use of a sufficient quantity of steam, he will load his gas with a large proportion of carbonic oxide; if considerable quantities of carbon remain in the solid state in the retort, the question of their removal becomes a practical difficulty.

We have noticed that in the case of petroleums and other liquid hydrocarbons containing something like 85 parts of carbon to 15 parts of hydrogen, there is little difficulty in converting them into permanent gas, and that with a very small residuum of carbon only. In this case we have a ratio of rather over 5 parts of carbon to 1 part of hydrogen. But when we have to deal with a liquid—or a solid either for that matter—that contains a larger proportion of carbon—for instance coal, in which the proportion of carbon to hydrogen is more like 14 : 1—the excess of carbon remains behind either in a practically pure state as coke, graphite, or soot, or retaining small quantities of hydrogen and oxygen, and forming pitch. Ordinary coal gas contains perhaps 3 : 1; and it is only the highest qualities of oil gas that reach the ratio of 5 of carbon to 1 of hydrogen, and a large proportion of the excess of carbon remains behind as coke, while the remainder is obtained in the pitch or tar. Now tar approaches towards the composition of coal, as it consists of about 80 parts of carbon, 7 of hydrogen, 11 of oxygen, and the remainder is nitrogen, sulphur, &c. It should also be mentioned that Mr. Burns is in error in supposing that the presence of the excess of carbon in a solid or suspended form in the liquid affects the result. Whether it is free or combined, the ultimate effect to the gas maker is the same.

At the best, it appears that not more than 35 parts (or less than half) of the total carbon, can be converted into the gaseous form in combination with hydrogen. To gasify the remaining 45 parts, 60 parts of oxygen would be required; and the ultimate composition would comprise 105 parts of carbonic oxide to every 42 parts by weight of oil gas. This is the most favourable result that can be secured. If we base our calculation on known practical conditions, and assume that only 28 parts of the carbon are taken up by the hydrogen, then the result would be 35 parts of oil gas to 121 parts of carbonic oxide. These proportions would be somewhat reduced by the fact that for every 8 parts of oxygen introduced by means of steam, there would be 1 part of hydrogen; but after allowing for this, it is evident that the proportion of carbonic oxide present would be 65 to 70 per cent. of the whole. A gas like this would be objectionable on account of its high specific gravity and poisonons properties; and the only way in which it could possibly be turned to practical account would be by mixing it with such a proportion of coal gas as to bring the carbonic oxide within reasonable limits.

For these reasons, it appears probable that inventors will have to rest satisfied with the conversion of something less than one-half of the tar into gas, the residue remaining either as tar or as pitch. Improved conditions of ordinary carbonization resulting in increased yields of gas per ton of coal, are a move in this direction. It is frequently said that the tars from retorts heated on the generator system are not so good, from the distiller's point of view, as those obtained in the old-fashioned mode of operation. The reason is simply that the gas is enriched and increased at the expense of some of the lighter constituents of the tar. This is evidently the most reasonable mode of procedure. If the tar is to be gasified, why not complete the gasification at one operation, instead of condensing it, and subsequently evaporizing at the expense of a further supply of heat? This constitutes a cardinal weakness in all processes for dealing with tar as a gas making material. They have the effect of removing it from the position of a residual to that of a gas-producing material; and it is thus brought into direct competition with coal. The gas engineer is called upon to decide, in the first place, whether or not the tar is really worth more to him for gas making purposes than the price offered for it by the tar distiller. In doing this he will remember that the tar is really an impure hydrocarbon liquid, containing sulphur and other foreign matters, and especially a large excess of oxygen, which is likely to interfere with the combination of the hydrogen with carbon, and therefore with both the yield and the quality of the gas produced.

The Royal Victoria Hall Science Lectures during the present month will embrace one, on the 13th inst., by Professor Bonney, on "London Water Supply."

TECHNICAL RECORD.

THE NORTH-EASTERN RAILWAY COMPANY'S GATESHEAD GAS-WORKS.

In last week's JOURNAL we gave a few particulars as to the present condition of the above-named works, in view of the visit paid to them the previous Saturday by the members of the North of England Gas Managers' Association. The Engineer in charge of the works (Mr. George Pettigrew) has since sent some details as to the improvements that have been effected in the works within the last few years.

He says: Visitors to the works five or six years ago would have seen the manufacture of gas carried on in a very primitive manner indeed; but when the present extensions are completed (which will now be in a few weeks), it will be difficult to find works of the same magnitude better adapted for the purpose. When the present Engineer took charge of the works, he saw the great need for improvement, and at once set to work to draw out plans and specifications for the much-needed extensions, with the intention of asking his Directors for a grant, which was at once acceded to. The extension of the coal depôts—work that could be done by the Company's own men—was commenced first; and the saving effected has been considerable. The coal waggons are now run to the place where the coals are wanted; whereas, previously, the coal had to be filled into bogies, run to where wanted, and there tipped. The scrubbers next demanded attention; and that they received a fair share, will be admitted by anyone who has seen the fine pair of tower scrubbers erected on the works. They stand 70 feet in height over all, and 7 feet in diameter; and by their action the whole of the ammonia and a great part of the sulphuretted hydrogen and other sulphur compounds are eliminated from the gas. The then existing retorts could not make the required quantity of gas; and, considering the available space, a fine retort-house, containing 35 retorts, has since been erected. A large locomotive boiler has been fixed to supply steam to the exhauster, steam-pump, and pulsometer. The steam-pump raises the ammoniacal liquor to pass through the scrubbers as well as liquor and tar to the overhead tanks. The new station meter is made to pass 25,000 cubic feet of gas per hour, which it is expected will answer the requirements of the place for a number of years. The governor-house, containing four hydraulic governors (two of them being Cowan's automatic governors), is fitted up in first-class style. The new purifiers are not quite finished; but a few weeks should see them completed and in action. The purifier-house is a commodious building, more than 50 feet square and 30 feet high. It contains four purifiers, 18 feet square; while a space of 6 feet in height is allowed under the ground floor, to admit of access to the pipes and connections. The sulphate works are in full operation; and most of the visitors expressed themselves as highly pleased with this part of the works. They are separated from the gas-works by a road leading to Messrs. John Abbot and Co's engineering works; but they are so situated that both ammoniacal liquor and acid pass through pipes from the gas-works to the sulphate works by gravitation. Steam is generated here also in a locomotive boiler, from which it passes to the primary still. The plant is on the continuous distillation process, and was recently erected by Messrs. R. and J. Dempster, of Newton Heath, Manchester. As showing the advantages to be derived by working with modern plant and on modern principles, Mr. Pettigrew adds that the cost of manufacturing, per 1000 cubic feet of gas, has been reduced one-half.

THE CHARGING AND DISCHARGING OF GAS-RETORTS BY MACHINERY.

An important invention relating to the charging of gas-retorts has just been brought out by Mr. S. J. Woodhouse, Gas Engineer, of Leeds, and which well deserves special attention.

Apart from the fact, says our correspondent, that the labour in front of the retorts whilst they are being charged and discharged is great and oppressive, there is with the present crude and very general method of throwing in the coal by hand and shovel, a great want of uniformity in the distribution of the coal over the bottom of the retort, and much loss of gas and fuel owing to the time required for discharging and recharging the retort. Mr. Woodhouse proposes, in his invention, to remedy these evils by the employment of a long scoop, of such depth and size as to hold the full amount of coal required to charge the retort. The peculiarity of Mr. Woodhouse's invention lies in the construction of the scoop, which is made in two halves (hinged together) secured close to each other along adjoining edges, and forming in this manner the scoop for holding all the coal required for one charging of the retort. The scoop is then filled and brought into position for being pushed into the furnace (before the discharging of the retort is commenced), so that the loss of time is reduced to a minimum. The connection of the two halves of the scoop together is such that it can be readily loosened, which takes place as soon as the scoop has been pushed into the retort. As soon as the

connection is loosened, the weight of the coal tends to cause the two halves of the scoop to move apart, opening out the bottom of the scoop along the middle line, and allowing the coal to fall through on to the bottom of the retort. The two halves of the scoop are also so geared together at the ends, by wheels, that this opening out can be caused to take place and be regulated by the attendant.

This new construction of scoop, it is claimed, permits of the retort being filled with ease by one man, and in a remarkably short space of time, compared with the arrangements now in use or proposed. Those at present employed require at least two men to manipulate them; and the work of turning them upside down in the retort to discharge them is very laborious, and also liable to damage the retort. Thus, though they may effect a slight saving of time, the advantages they offer in practice are so slight that in many large gas-works the retorts are still fed in the old-fashioned manner by shovel. The proposal to use a scoop formed in halves—which can be moved apart sideways and upwards, removing as it were the bottom of the retort altogether—offers so many points of advantage (especially ease, rapidity, and uniformity in charging) that its further development will be looked for with interest by gas engineers and managers.

Mr. Woodhouse's scoop, it may be mentioned, can be readily adapted for use by machinery, where such is in existence.

OHIO GASLIGHT ASSOCIATION.

The Sixth Annual Meeting.

This Meeting was held at Toledo, Ohio, on March 19 and 20, under the presidency of Mr. E. LINDSLEY, of Cleveland.

After the usual routine business (which included the election of 33 new members, and of Mr. Emerson M'Millin as an honorary member) had been disposed of, the PRESIDENT proceeded to deliver an Inaugural Address. He reviewed in a general way the progress of events in the gas industry during the past 20 years; insisting that, with the improvements in gas appliances, intelligent use on the part of the consumer became more and more a necessity. Referring to the work of the Legislation Committee appointed by the Association at the last meeting, he instanced the question of whether the existing statutes enabled gas companies, by the vote of the shareholders, to so amend their Charters as to enable them legally to engage in the supply of electric light, as one of great importance. The Attorney-General had, he said, decided it adversely; but the correctness of this decision might be easily tested without great expense, as the only other alternative was incorporation under a new Charter. There was a growing sentiment in favour of municipal control over gas, as well as other things; but history clearly showed that the exercise of such control had not been conducive to the furnishing of cheap gas in the past. The useful work done by Gas Managers' Associations was touched upon, in connection with the rapid growth and development of the Ohio Association; and the importance of special education for coming gas engineers was referred to.

Mr. G. W. BOWERS read the first paper, on "The Combination of Gas and Electric Lighting in a Small Town." He recounted the experience of the old Hillsboro' Gas Company, who in 1875 secured from the Corporation of the town a ten years' contract to supply gas for street lighting at about £8 per lamp, and private lighting at 16s. 8d. per 1000 cubic feet. The town was small, comprising only 4000 inhabitants, and the consumption was very low until the price was reduced to 12s. 6d., after which it showed a small increase each year. At the expiration of the contract, the Company proposed to renew it upon the terms of £4 3s. 4d. per lamp, and 8s. 4d. per 1000 cubic feet for private consumption. But the Corporation would not agree; and, under threat of an electric light competition, the Company, having regard to their capital of £8000, agreed to a two years' contract at the rate of £3 2s. 8d. per lamp and 6s. 3d. per 1000 cubic feet. They did this in the hope that the great reduction in price would bring about an increase in the demand for gas; but in this respect their hopes were disappointed, as the consumption went back instead of forward. At the end of the two years the electric question was again brought up; and they were thus led to seriously consider the addition of electric lighting to their business. The price at which they were selling gas did not yield profit. They commenced lighting the streets with 60 arc lights a year ago; and these, supplied at the low rate of £15 3s. 4d. per lamp per annum, only just paid for themselves. They were, however, looking to the exceptional position in which they were placed for supplying incandescent electric lamps for private use, as a means of earning a dividend; but as yet they had not secured a sufficient number of orders to warrant a start in this department. They wanted a guarantee of 200 lamps at 3s. 2d. per month, and hoped to secure this in the course of a few weeks.

Discussion having been invited, Mr. Penn said he had had some experience with the supply of gas and electricity in a town about twice the size of Hillsboro'. The author of the paper had certainly been forced, by competition and influences brought to bear on the Company, to supply both gas and electricity at very low rates; and he thought it would be well if the Association could come to the help of those situated in such hard circumstances, if only by giving them advice. He found that the electric light, by creating a demand for better and more brilliant lights, assisted the gas consumption. In fact, his gas-works were running up to their maximum capacity, and he introduced the electric light as a means of avoiding further outlay for extensions; but he found the extensions would be required notwithstanding. Mr. Booth, like the author of the paper, had himself put in an electric lighting plant, in order to avoid competition from outsiders; but, like Mr. Penn, he had been able to obtain better terms—viz., £18 15s. per lamp for street lighting. His price for gas was 5s. per 1000 cubic feet; and he had scarcely worked long enough to be able to say whether or not the electricity paid better than gas. He was about to undertake the supply of incandescent lighting, in response to the wishes of his customers. Mr. Wilkiemeyer said that at the desire of his Directors he had investigated the various systems of electric lighting in use previous to entering upon this department. As the result of his observations, he was not altogether hopeful about it. All this threat of competition, &c., suggested one thing to him, and that was the advisability of conciliating the public as far as possible by selling gas at the lowest remunerative price. It always had a bad effect when a large reduction was made under compulsion.

Mr. C. R. FABEN, jun., followed with a paper on "Graduated *v.* Uniform Rates." Referring to the various opinions on this subject, he said there was no precedent and no reliable data available on which to base a system of graduated rates; but it was a very general thing for gas companies to make small concessions—some in one way, some in another—to their customers. Electric light companies seemed to step in and secure large additional lighting, where gas had stood still for years before; and this was effected by liberal concessions to large customers. Why should not gas companies do likewise? Or, failing artificial lighting, now was the time to make a move in the direction of the increased use of gas for fuel and power purposes. Many companies were making liberal allowances with this object in view; and it would be well if the established practices could be compiled, for the use of gas engineers. Some notice of peculiar local conditions, if any, should be included. He thought that a broad and liberal system of "graduated rates" would be the means of securing a large increase in the demand for gas.

Mr. Hyde opened the discussion by saying that, as a principle, there should be one price for gas; but at the same time they should be on the look-out to seize all opportunities of increased business that presented themselves. Gas would not be used to any important extent for fuel so long as the system of uniform rates was adhered to; so he favoured a much lower rate for day consumption. He also directed attention to the importance, as far as possible, of improving the apparatus supplied for cooking or warming houses by means of gas. Mr. Penn was in favour of uniform rates for illuminating gas, and of a much lower uniform rate for that used as fuel gas. Mr. Tayler agreed with this; and with regard to graduated rates for illuminating gas, thought it was a local question depending upon the quantity used by the consumer. Mr. Printz thought it seemed hardly fair to supply one man with (say) £1 worth of gas for fuel purposes, at a cheaper rate than another who used £2 worth for lighting. The two rates would also, he said, require in most cases two meters. So he was in favour of a low uniform rate, with moderate discounts on accounts exceeding certain limits. Mr. Evans allowed 20 per cent. discount for prompt payment, and another 20 per cent. if the consumption exceeded 5000 cubic feet per month. He considered that a graduated price based on the quantity burnt encouraged the customer to increase his consumption so as to get the gas at a lower price. Mr. Strong thought the matter came down to the introduction of a scheme that would be best suited to local requirements and the nature of the district.

The next item on the programme was the consideration of the subject of the municipal control of gas or electric lighting, which appears to be attracting some interest in the locality, seeing that no less than three papers were read upon it. The first was by Mr. H. Wilkiemeyer, of Portsmouth, who contended that municipalities were simply intended to act the part of policemen in watching over the interests of the community, and that whenever a single departure from this rule occurred, another item of personal liberty was drawn into the greater vortex of centralization of power. It was therefore wrong, on first principles, for them to engage in any business or occupation other than that for which they were originally established. It might be safely laid down as an axiom, that whenever a city embarked in a venture that even savoured of money-making, it was exceeding its legal powers or encroaching upon rights never ceded by the people. The managers of a municipal plant had not the same material interest in its economical and successful administration, as had those who supervised that held by an actual owner; and looseness and carelessness in the management were almost inevitable. He showed that the cry of "monopoly" was really a mistake, as in these days a gas company who tried to make an exorbitant profit could soon be checked; and he urged that the idea of a city entering into a business with a view of conducting it at cost price for the benefit of the inhabitants, was a dangerous precedent, as it limited private enterprise and the investment of capital. Mr. M. A. Gemunder, of Columbus, commenced his paper by exposing the fallacy of the argument that the people as a whole should

unite in controlling that which ministered equally to the welfare of all. The public, as a whole, could never operate a water-gas or electrical plant. They could only do it through a few special agents. All arguments for municipal ownership came down to greater service for the same pay. More energy could not leave a machine than was put into it; and on similar lines he asked how the labour of a municipality could be more productive than that of a private organization. Comparing Government and municipal officials with those of private companies, he considered that the brightest and strongest characters and intellects were of necessity monopolized in productive channels outside the sphere of Government. Work must necessarily be better done when the worker was directly responsible to his employers, than when his responsibility was only of an indirect nature. Mr. A. R. Foote, of Washington, in his paper, said that the only argument in favour of municipal control was cheaper lighting, and it was one that might be applied to the national ownership of every productive or distributive industry. The logical sequence of State ownership was Government ownership; and the inevitable result of the Government monopoly of one industry would be a Government monopoly of all industries.

Mr. W. C. Hedges exhibited tables of street-lighting statistics in Ohio and Indiana; showing the price of gas charged for illuminating or for fuel purposes in 62 cities, and the prices of electric lighting in 69 cities. Taking 35 cities in Ohio, the average price of gas is 6s. 2d. per 1000 cubic feet, and that sold for fuel or power, 5s. 7d. per 1000 feet. Most of the cities have their streets lighted by arc electric lamps, at a cost far exceeding that of gas for street lighting.

(To be continued.)

Electric Lighting at Brighton.—A Local Government Board inquiry was held last Tuesday before Mr. Codrington, on the application of the Corporation to borrow £37,000 for the purposes of electric lighting and the purchase of land for a storeyard. Several legal gentlemen appeared for various interests in opposition, including one on behalf of the local Electric Light Company. The case for the Corporation was to the effect that they intended to adopt the continuous system at low pressure, combined with storeage batteries, which they considered would be the safest and most economical. The question is exciting great interest in the town—being made the test question at a bye-election now on; and a petition signed by 10,000 ratepayers, protesting against the scheme, was handed in.

An Unremunerative Price for Electric Lighting at Eastbourne.—The Eastbourne Town Council have had before them a letter from the Board of Trade (with which they forwarded a copy of a letter received from the Eastbourne Electric Lighting Company's agents in support of the Company's application for a Provisional Order) in which they pointed out that the maximum charge in the model form of Order was 8d. per unit. The Board stated also that they did not propose to allow a higher price, unless special circumstances existed to justify it; and they asked for the observations of the Corporation on the matter. The letter from the Company's agents set forth various reasons why a charge of 10d. per unit should be sanctioned. The Company had, it was stated, expended between £25,000 and £30,000 in the laying of 9 miles of mains, and plant for other purposes incidental to the supplying of electricity. The charge now made was 1s. per unit, and above 100 motors, 8d. per quarter; but even at this price, no profit had been made. Attention was also called to the fact that the Corporation had assented to the application, and to a charge of 10d. being included in the Order; and a hope was expressed that the Board of Trade would allow that figure to stand, particularly as the local authority had power of appeal every seven years. After the reading of these letters, the Deputy-Mayor (Mr. Boulton), who is the Chairman of the Electric Light Company, stated that 8d. was a figure at which the electric light could not be supplied. Therefore if 8d. was fixed by the Board of Trade, the Company would be obliged to shut up their works. The Council passed a resolution to the effect that a reply be sent to the Board, accepting the price as fixed by them in their Model Order.

Colonial Gas Undertakings.—According to advices recently to hand from New Zealand, a Company is being promoted, under the title of the Gore Gas Company, Limited, to light the streets of that town, and supply the inhabitants with hydrocarbon gas produced by a system patented by Mr. Watt, a resident. The capital is £5000 in £1 shares. The prospectus states that Mr. Watt's process has been found much cheaper than that usually employed in gas manufacture, while the product has a far higher quality than ordinary coal gas. It has been tested by Mr. R. R. Knight, Engineer and Manager of the Invercargill Gas-Works, who has expressed his approval of Mr. Watt's ingenious system. Mr. Watt holds a concession for the supply of gas for the next 14 years; and this he is willing to transfer to the Company for £500 in fully-paid shares. Passing from a new to an established undertaking, we find that the Timaru Gas Company, at their last annual meeting, adopted the Directors' report recommending a dividend of 10 per cent., and carried £317 forward, after writing off £555. The Chairman (Mr. F. Le Cren) stated that the dividend was less than usual owing to concessions in the price to stimulate consumption. The Directors hoped to receive support to enable them to reduce the price to 10s. per 1000 cubic feet before the year is out, and to see a large consumption of gas for cooking purposes. At the recent half-yearly meeting of the South Brisbane Gas Company, Limited, the report of the Directors stated that, owing to the increased demand for gas, it had been found necessary to supplement the plant. A contract had accordingly been entered into for the supply of a telescopic holder capable of containing 600,000 cubic feet of gas. In order to meet the expense which this work will entail, it is proposed to issue further capital to the amount of £25,000—bringing up the total to £100,000. The report was adopted.

REGISTER OF PATENTS.

Revolving Gas-Lamps for the Combined Purposes of Illumination and Advertisement.—Horrocks, J., of Southport. No. 5043; March 23, 1889. [8d.]

This invention consists of various means of constructing the bodies of lamps, and causing them to rotate round their pillars or suspendant rods. In suspended lamps the rod is attached to the frame of the lamp body; and the whole rotates on a cup or ball joint, as in an ordinary chandelier. In other respects the lamps are constructed as described for non-rotating lamps used for advertisement and illumination in patent No. 15,484 of 1886; the illuminant being either gas, oil, or electricity, or any other suitable source of light.

Altering the Proportions of Mixed Gases.—Fox, S., and Blass, E., of Leeds. No. 6129; April 10, 1889. [6d.]

This invention relates to a method of altering the proportions of the gases in a mixture of gases by eliminating definite quantities of the respective gases by compressing the mixture in presence of a suitable absorbent (such as water), and utilizing the compressed gas mixture or absorbent under pressure, or either of them, to aid in driving the compressing apparatus. In carrying out the invention, a compressing pump is used that compresses the gas mixture mixed with the absorbent—say, water—into a reservoir, or else the gas is compressed into the reservoir, and the water is forced into this reservoir. Connected with the compressing-pump are gas and water motors driven (separately), one by the water under compression in the reservoir, and the other by the compressed gas mixture also in the reservoir; the rest of the power required for actuating the pump being provided by any suitable motor.

Fastenings for Retort-Lids.—King, G., of the Beckton Gas-Works. No. 9375; June 5, 1889. [8d.]

This invention has for its object to provide retort-lid fastenings which will make a tight joint between the lid and mouthpiece, and wherein the working parts of the fittings are protected from tar and dirt.

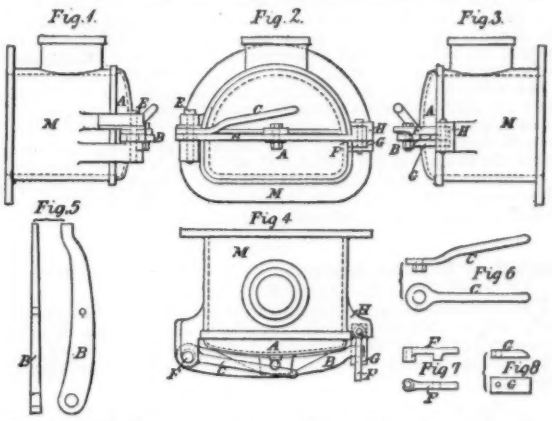


Fig. 1 is a side elevation of the mouthpiece, lid, and fastenings; and fig. 2 is a front elevation. Fig. 3 is a side elevation (opposite to that shown in fig. 1); and fig. 4 is a plan of same. Figs. 5 and 6 are details of the lever. Fig. 7 is a detail of the crossbar catch; and fig. 8 is a detail of the fixed rest for the crossbar.

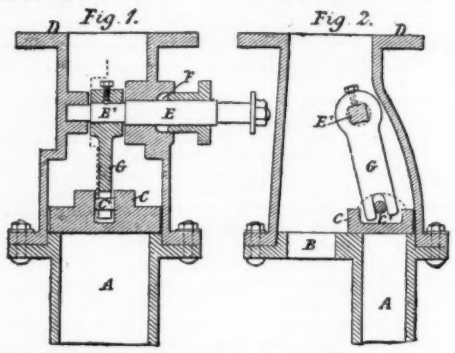
The lid is supported by the crossbar B by means of a bolt passing through a lug on the door, which bolt also serves (by a cam thereon) to adjust the face of the lid to that of the mouthpiece M when required. At one end of the crossbar a hole is formed, in which fits an eccentric boss on the underside of the lever C, which is used to effect the tight closure of the door. The cross-bar and lever, when in position on the mouthpiece, are fitted between two hinge lugs cast on one side of the mouthpiece; a pin E passing through these hinge lugs and through a hole in the lever, the boss entering the hole in the cross-bar. When the lid, crossbar lever, and pin are fitted together on the mouthpiece, the crossbar and lever, together with the lid, will be free to swing round the hinge pin E; the bearing surfaces being protected from tar and dirt by the lugs already referred to. The catch F and rest G are fitted to the catch-box H cast on the side of the mouthpiece opposite the lugs; both catch and rest being held in position by a pin passing through them. The rest is so fitted into the catch-box that it is a fixture; and the catch is free to swing round the securing pin as far as is necessary to allow the catch to be engaged with, and disengaged from, the end of the crossbar.

On closing the lid towards the mouthpiece, the free end of the crossbar B is raised by the incline on the rest G, and is supported upon the rest so as to relieve the hinge end of the crossbar from strain liable to cause a binding of the lever C in the hinge lugs. The catch F is then engaged with the end of the crossbar, and the lever is moved towards the lid—the eccentric boss making a portion of a revolution in the hole of the crossbar B, and causing the crossbar and lid to be forced towards the mouthpiece face, and secure a firm and tight joint. During the closing and fastening of the lid, it is slid against the surface of the mouthpiece face.

Anti-Dip Pipes for Hydraulic Mains.—Meiklejohn, N., of Longwood; No. 11,456; July 17, 1889. [8d.]

This invention relates to a hydraulic main to be employed in the manufacture of gas, provided with an ordinary dip-pipe, and with an anti-dip thoroughfare, which may be opened or closed by a valve operated by the partial rotation of a spindle about its axis; the spindle

being actuated by hand, or automatically by the opening and closing of the retort-lid.



Figs. 1 and 2 are vertical sections (at right angles to each other) taken through the dip-pipe, valve, and actuating lever.

The hydraulic main is provided with an ordinary dip-pipe A, and an additional opening or anti-dip B above the level of the water in the main. The upper face of the plate is machine surfaced; and on it is mounted a slide-valve C, constructed so as to be capable of sliding backwards and forwards, in order to cover or expose the opening B, as may be desired. On the plate is also mounted a valve-box, which forms a continuation of the ascension-pipe; being coupled to the pipe by means of the flange D, or by a faucet and socket joint, if desired. The valve-box is prepared to receive a spindle E, which passes out through a stuffing-box F in the side. This spindle is connected, by a lever G, with the valve C in such a manner that a partial rotation of the spindle about its axis will cause the valve to slide on its seat from one side of the box to the other. In the arrangement shown, the connecting lever G is mounted on a squared portion of E¹ of the spindle, and is forked at the lower end so as to straddle a pin C¹ formed with (or fixed in) the valve. The spindle E is prepared to receive a handle, by means of which the valve may be operated as desired—that is, it may be slid over the opening or anti-dip B so as to compel the gas to pass through the ordinary dip-pipe, or to prevent back draught when the retort is opened; or, when removed to uncover the anti-dip B, the gas passes freely into the hydraulic main without causing pressure in the retort.

The valve is shown as entirely closing the mouth of the dip-pipe when removed from the anti-dip B; but this need not necessarily be the case, as, whether the dip-pipe be closed or not by the valve, the gas will always pass by way of the passage B when open. In order to ensure the closing of the anti-dip B when the retort is opened and *vice versâ*, the handle of the spindle E may be connected to the retort-lid by a chain or otherwise in such a manner that the opening and closing of the lid will automatically operate the valve.

Sulphate of Ammonia Apparatus.—Wilton, T. and G., of the Beckton Gas-Works. No. 19,225; Nov. 29, 1889. [8d.]

This invention relates to apparatus for the purpose of effecting the ready and economical removal of sulphate of ammonia from the saturators and its transference to the drainers by means of self-acting apparatus applied to, and used in combination with, the depositing vessel.

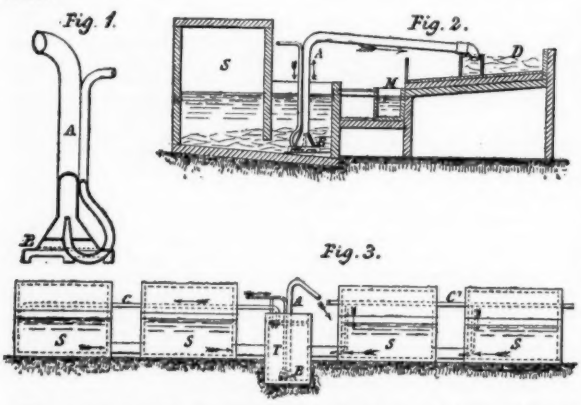


Fig. 1 is an elevation (partly in section) of an "ejector." Fig. 2 is a section through an ordinary arrangement of saturator, mother-liquor trough, and drainer; showing the ejector fixed in the depositing vessel—in this case the saturator itself. Fig. 3 is an elevation of four saturators connected together in pairs and to a lower-level depositing vessel, to which the ejector is applied.

A is the ejector (of lead) consisting of a trumpet-shaped pipe with its lower end terminating in or at a base plate B, with slots or passages for the ingress of deposited salts. To this is applied a steam-pipe terminating in a nozzle at or near the base of the ejector. In fig. 2 the ejector is fixed in the trough of an ordinary saturator S, from which sulphate of ammonia is usually removed by hand; but it may be applied to any construction of saturator. M is the mother-liquor trough; and D, the drainer. The upper end of the ejector is connected by ordinary lead piping to a point of support above the drainer. It conveys the discharge of the ejector to the drainer, which may have a midfeather to limit the flow of deposit, and an overflow for the excess liquor. In fig. 3 two pairs of saturators S are shown connected together by pipes, and to a lower-level ejector tank T; the discharge-pipe from the ejector being led to the drainer in the same manner as is illustrated in fig. 2.

On turning on the steam, the discharge of salts from the ejector tank to the drainer commences, and will continue without any assistance until steam is turned off.

The patentees propose to use a natural circulation, or (to augment the carrying power of the liquid agent employed when there are many connected saturators) a current may be induced through the whole series by a steam-jet or other suitable means. Two methods of effecting this are illustrated in fig. 3. According to that illustrated to the left of the figure, a pipe C is fixed with one end terminating in a bell-mouth below the liquid level of the tank T (but above the deposit level), and having a steam-jet applied to it as above described for the ejector itself. The pipe C leads to, and terminates above, the liquid level of the farthest saturator; and thus liquid is raised from the upper part of the ejector tank and delivered as far away as possible therefrom before circulating back thereto. According to the method illustrated to the right of fig. 3, steam-jets are carried from the steam-pipe C¹ into the connecting-pipes, and thus also circulation is augmented.

Gas-Heated Boilers.—Spencer, J. T., of Reading. No. 3487; March 4, 1890. [6d.]

This "invention" refers to an arrangement of a gas or oil heated stove or boiler with a mirror or reflector attached to the door; the justification for such an arrangement being (as stated by the patentee in his specification) that "stoves or boilers of this kind are frequently arranged in such a manner that for a person to see the heating flame, for the purpose of regulating the same, it is necessary to stoop, and in many cases so low as to bring the head almost level with the ground." The proposed arrangement is intended "to enable a person looking down at the said mirror to see the reflection of the bottom of the boiler and of the heating flames." A wonderful invention, truly!!

APPLICATIONS FOR LETTERS PATENT.

5434.—Williams, H., "Improvements connected with the manufacture of water gas and other gases for lighting and manufacturing purposes." April 10.

5464.—Hawkins, J. G., and Barton, J., "Improvements in vertical gas-retorts, together with their lids, doors, and other attachments." April 10.

5479.—Lanchester, F. W., "Improvements in gas motor engines." April 10.

5496.—Wastfield, E. G., "Improvements in and relating to gas motor engines." April 11.

5731.—Imray, O., "Means of coupling metallic pipes." A communication from the Hogan Engineering Company. April 15.

5744.—Jackson, B., "Improvements in gas-stoves." April 16.

5853.—Beechey, C. G., "Improvements in gas-governors." April 16.

5895.—Marriott, E. E., "Improvements in shades for gas and lamps." April 19.

5915.—Bonne, C. R., "Improvements in apparatus for preventing loss of water in water-pipes in case of bursting." A communication from L. Herrnberg and F. Zipperling. April 19.

5933.—Dheyne, J., Nydpruck, Comte de, and Hault, F. de la, "Improvements in or connected with gas or vapour engines." April 19.

5972.—Otto, N. A., "Improvements in gas and oil motor engines." April 19.

5992.—Newton, J., and Quiggin, D. A., "Improvements in fluid tight joints or couplings for pipes and the like." April 21.

6015.—Hamilton, J. H., "Improvements in gas or combustible vapour motor engines." April 21.

6080.—Ward, J. W., and Griffith, C., "A filter which is attached to the water companies' taps in houses through which the water is forced by the companies' pressure." April 22.

6101.—Castagnino, G., "Improvements in apparatus for distributing, diffusing, or reflecting light." April 22.

6113.—Otto, N. A., "Improvements in gas and oil motor engines." April 22.

6138.—Clarke, S., "Improvements in screens or shades for lamps and gas or electric lights." April 22.

6167.—Dodwell, G. W., "An improved high and low-pressure screw-down anti-freezing stop-cock." April 23.

6181.—Bayly, J. P., "Improved pipe wrench and pipe and bolt cutter." A communication from Ephraim Smead. April 23.

6183.—Widmer, F. and A., "A valveless syphon water-waste preventer or flushing cistern." April 23.

6189.—Lavender, R., "A new or improved gas-burner." April 23.

6217.—Griffin, S., "Improvements in apparatus for producing combustible gas for gas motor engines or other purposes." April 23.

6256.—Rock, T. D., "The application of anthracite gas for metallurgical and other purposes." April 24.

6269.—Livesey, G. T., "Improvements or means for guiding gas-holders." April 24.

6302.—Tyler, A. T., and Vesian, J. S. E. de, "Improvements in three-way hydraulic valves." April 25.

6357.—Brain, H. C., "Improvements in centrifugal governors for steam-engines, gas-engines, and the like." April 26.

6366.—Lockhead, J., "An improved reflector for the globe of a gasalier or bracket; and claim to give an increased light, ensure perfect combustion of the gas, and thus prevent damage to the ceilings by smoke." April 26.

6406.—Streeter, F. S., "Improvements in water-waste preventers. April 26.

6407.—Dawson, H. T., "Improvements in gas-engines." April 26.

The Gas Supply of Wellingborough.—The offer made by Mr. J. H. Lyon, of Cosham, to lay down 24 of his patent combination syphon and test boxes on the trunk main, and throughout the new district about to be supplied by the Wellingborough Gas Company, has been accepted. The pipes for this extension will be supplied by the Stanton Iron Company, whose tender was the lowest of the 12 received.

CORRESPONDENCE.

[We are not responsible for the opinions expressed by correspondents.]

Water Rates for Temporarily Closed Houses.

SIR,—Mr. Livesey's reply to the question as above (*ante*, p. 595) does not appear to me to be sound advice, nor proper to be adopted by all companies.

Take, for instance, the long list of seaside resorts throughout the United Kingdom. The water-rates are mostly based on 5 per cent. per annum on the value, and an extra charge for water closets and baths. It is not a quarterly rate; and the intention of the framers of this Act was to fix an equitable annual amount. Every consideration was given to the many questions that are continually coming before the public; and allowance for every contingency was made. A large collection of statistics was obtained; and it is agreed by most water companies' managers that the annual amount fixed is a most reasonable rate. Looking at the low rate of dividends paid by very many of these companies, such deductions as are advocated would be most ruinous, and cause an endless amount of litigation, as well as "needless irritation." I am acquainted with thriving fashionable watering places where one-third of the houses are empty for two, three, and four months in the year. A large profit is made during the season; and thus the consumer makes amends for any lack of the use of water during the empty season.

I agree with your correspondent that a conciliatory spirit is always preferable in dealing with a cantankerous consumer; and when he demands this stupid reduction, and also demands to have a workman sent to shut down his own stop-cock, I have found a friendly explanation has always put matters straight, and relieved the collector from any difficulty on his next visit.

If the same conciliatory spirit had been adopted by the London Companies, Mr. Dobbs would never have been known.

April 30, 1890. TWENTY-FIVE YEARS' EXPERIENCE.

Water Supply by Meter for Domestic Purposes.

SIR,—I have been expecting a reply from "High Pressure" in answer to the letter signed "Constant Supply" (*ante*, p. 199). Your readers will observe that the cases cited are not parallel, and that his objections are all answered in the "Correspondence" columns of Vol. LIII. of the JOURNAL. It does not follow that, because the water supply is in the hands of the "governing body," the sanitary condition of the town is perfect, or in a satisfactory state; but the death rate should have been stated.

It is quite evident that "Constant Supply" is unacquainted with any system of inspection but his own. Who is there to be found in these days going from house to house to inspect these fittings? The day inspector visits those houses *only* where waste has been proved to exist by the night inspector. He is thus able to cover an area containing a much larger number of houses than that quoted.

Then, as to the cost of the "meter survey" once a quarter. My opinion is that meters should be read once every month, and not by a solitary five-shillings-per-day man once a quarter, and then left to stick or stop altogether. The idea of one man looking after 5000 meters, reading, removing and replacing, testing, attending to complaints, settling disputes, &c., for £63 per annum, needs no comment.

Perhaps a nearer approximation to the cost of inspection to prevent waste in a town having a population of 40,000 would be as follows:—One night inspector, £71 10s.; two men by day employed searching out and repairing the leaks discovered by the night inspector, and making good roads and pavements, &c., £130—total £201 10s.

Cost of inspecting 5000 meters to be used for the express purpose of preventing waste: Meter reading per month, attending to complaints, and advising invoice clerk at office; removing and replacing (two men); testing and repairing (one man); carriage, making good the roadway, paving and material; 5 per cent. on capital £20,000, and fixing; one extra clerk; depreciation of plant (say), £1480.

I believe the Manchester Corporation Water Committee have about 10,000 meters. They employ twelve meter readers, and fourteen hands are employed constantly as a repairing staff. The East London Water Company use about 5000 meters; and it would be well if they could keep them properly read, tested, and repaired for £63 per annum!

At Providence, U.S.A., they use about 8000 meters; and three men read them in about five weeks. There is a shop expressly for the repair of meters. Wages and total cost of maintenance come to about £900; the consumption being 43 gallons per head. Some American engineers put the cost of maintenance at 12 per cent.

Many of your readers would be glad if your correspondent will name the eminent engineers he speaks of as advocating a water supply without cisterns. How would "Constant Supply" manage were the 48-inch main to burst in Commercial Road? or the 36-inch main in the Strand? How would he manage during alterations and fixing new hydrants? Fancy any portion of the Strand without water for five minutes!

If any of your correspondents will kindly supply reliable figures as to the cost of maintenance of 5000 meters, it will no doubt be of great service to many of your readers as well as to a

April 30, 1890. METER READER.

Electrical Signalling Apparatus for Gas-Works.—In reference to the paragraph on this subject appearing in last week's JOURNAL (p. 792), Mr. Robert Dempster, sen., of Penmaenmawr, under date of the 1st inst., writes: "In reply to Mr. Holgate, the Engineer of the Halifax Gas-Works, I think he has read the article (p. 740) in too great a hurry. I do not claim to be the original designer of the apparatus; no more can Mr. Holgate. Possibly he will be surprised to learn that it is more than 20 years since I saw electricity applied for the same purpose in a gas-works not 50 miles from his own. Before Mr. Holgate's apparatus was made, my opinion was asked about it; and I have been astonished that so simple and useful an apparatus has not been more generally adopted."

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Thursday, May 1.

GAS AND WATER ORDERS CONFIRMATION BILLS.

Three Bills to confirm certain Provisional Orders made by the Board of Trade under the Gas and Water Works Facilities Act, 1870, were presented by Lord Balfour of Burleigh, read the first time, and referred to the Examiners. The Gas Orders Confirmation (No. 1) Bill related to the Alton (Hants) Gas, Hoylake and West Kirby Gas, Sheffield Gas, Tonbridge Gas, and Yorktown and Blackwater Gas Orders. The Gas Orders Confirmation (No. 2) Bill related to the Huntingdon and Godmanchester Gas, Llandrindod Water Gas, Studley Gas, and Wellingborough Gas Orders. The Water Orders Confirmation Bill related to the Caton Water, Mid-Kent Water, Stockport District Water, and Todmorden Water Orders.

During the past week, the following progress has been made:—

Bill read the first time and referred to the Examiners: Pontypool Gas and Water Bill.

Bills read a second time and committed: Derby Corporation Bill; Gravesend and Milton Gas Bill.

Bills reported: Derby Gas Bill; Hartlepool Gas and Water Bill.

Bills read the third time and passed: Clayton, Allerton, and Thornton Gas Bill; Derby Gas Bill; Hartlepool Gas and Water Bill.

Royal Assent given: Clayton, Allerton, and Thornton Gas Bill.

HOUSE OF COMMONS.

Monday, April 28.

ELECTRIC LIGHTING ACTS AMENDMENT BILL.

A Bill to amend the Electric Lighting Acts, 1882 and 1888, was brought in by the Lord Advocate, Sir M. Hicks-Beach, and the Solicitor-General for Scotland, and read the first time.

LEEDS ELECTRIC LIGHTING.

Mr. WADDY asked the President of the Board of Trade whether he could explain the circumstances under which the Board of Trade had refused the application of three Companies for parliamentary powers to supply electric lighting to the borough of Leeds, notwithstanding the important demand for the light by the inhabitants; whether this refusal was in consequence of the opposition of the Local Authority; and, if so, whether he could state if the Local Authority had taken any steps themselves to apply for powers for supplying Leeds with the light.

Sir M. HICKS-BEACH: The Board of Trade refused to proceed with the applications of the three Companies referred to in consequence of their not having obtained the consent of the Local Authority as required by the statute. The Corporation of Leeds state that a Committee of their body are engaged in an exhaustive and costly examination of the question of the supply of electricity, and they ask that the matter may be postponed until next year. The Board of Trade, in these circumstances, declined to dispense with the consent of the Corporation, but informed that body that, in the event of their not being prepared to apply for powers themselves next year, the Department would have to consider whether or not they could refuse to grant powers to other promoters.

Tuesday, April 29.

The London Subways and Overhead Wires Bill and the London County Council Bill were referred to a Select Committee consisting of Sir Joseph Bailey (Chairman), Mr. Herbert Gladstone, Mr. Coddington, and Mr. M'Laren; to meet on Tuesday, May 6.

The Bilston Commissioners (Water) Bill, the Glasgow Corporation Bill, the Partick, Hillhead, and Maryhill Gas and Electricity Bill, and the Airdrie and Coatbridge Water Bill, were referred to a Select Committee consisting of Sir Wilfrid Lawson (Chairman), Mr A. Gathorne-Hardy, Viscount Baring, and Mr. Ballantine; to meet on Thursday, May 8.

GAS DIRECTORS AND ELECTRIC LIGHTING ORDERS.

Mr. O. V. MORGAN asked the President of the Board of Trade, in the event of it being brought to the knowledge of the Board that certain members of corporations are directors and shareholders in gas companies situated within the jurisdiction of such corporations, whether, in pursuance of the powers vested in the Board of Trade under the Electric Lighting Acts to dispense with the consents of the local authorities, this would be deemed a sufficient reason for the Board to dispense with the consents of such local authorities, and grant Provisional Orders to other undertakers who might be applying for Provisional Orders in the districts affected.

Sir M. HICKS-BEACH, in reply, said: The mere fact that certain members of local authorities are shareholders in gas companies within the district of the local authority would not of itself be deemed a sufficient reason to justify the Board of Trade in dispensing with the consent of such local authorities to Provisional Orders applied for by private promoters. If, however, it could be shown that the refusal of the local authority to give their consent is due to the votes of any members who were improperly influenced in giving those votes by their personal interest in local gas undertakings, I should be disposed to consider the expediency of directing an inquiry into an application to dispense with that consent.

Thursday, May 1.

THE DISPUTE AT THE PECKHAM GAS-TESTING STATION.

Mr. BULNOIS gave notice that on Monday, May 5, he would ask the President of the Board of Trade, whether he will move the Attorney-General, under section 45 of the Metropolis Gas Act, 1860, to take action against the South Metropolitan Gas Company, as he has twice been requested to do by the London County Council, for their conduct in cutting off the supply of gas from the testing-place in

Hill Street, Peckham, whereby since September, 1889, it has been impossible to test the gas except for two short periods.

THE AMENDMENT OF THE MODEL ELECTRIC LIGHTING ORDER.

Mr. KIMBER asked the President of the Board of Trade whether, as the Board had struck out, at the instance of local authorities, clause 6 of the Board's Model Order prohibiting a supply of electricity beyond the area of supply, he was prepared to make a similar concession to electric lighting companies; and whether he would grant to companies the same concession—namely, an appeal to the Board of Trade—in the matter of compulsory works, which the Board made to local authorities at their recent interview with the officials of the Board of Trade, on April 24 last.

Sir M. HICKS-BEACH: My answer to the first inquiry must be in the negative, seeing that the position of a company limited to an area, and possibly with other companies in adjoining areas, is distinct from that of a local authority having jurisdiction over their own local district, even though this should be larger than their area of supply. As regards the second inquiry, I may say that I am prepared to treat companies and local authorities alike.

THE SALFORD GAS SCANDAL.

Mr. E. HARDCASTLE presented a petition signed by 15,000 inhabitants of Salford, praying for the appointment of a Commission to inquire into certain alleged fraudulent transactions in connection with Corporation contracts.

Mr. BRADLAUGH asked whether, under the Standing Order which in matters of personal grievance of an urgent nature permitted debate, he should be in order, on the petition which the hon. member for Salford had presented, in raising the question with which it dealt. The allegation was that there had been gross frauds at Salford—a man being now in gaol in connection with them; and that an endeavour to compromise them by the payment of a considerable sum of money was being made, one of the terms being that actions should be brought against certain people alleged to be parties to the frauds, and the sums obtained applied in payment of the compromise money. Unless the House took action, justice would be defeated; and he therefore wished to know if, on the presentation of the petition, he should be in order in raising the question.

The SPEAKER said he did not think the case came under Standing Order No. 20, which made an exception in the case of a pressing personal grievance. If the hon. member had presented a petition from anyone in gaol, the case would have been different.

Mr. BRADLAUGH said it was rather the reverse of the case of a person in gaol. It was a personal grievance on behalf of the ratepayers of Salford. They had been defrauded of an enormous sum, and this was an attempt to avoid the enforcement of the law.

The SPEAKER said that was the distinction he had endeavoured to draw between a personal grievance and a case of this kind, which he did not think of such importance as to justify a debate on the petition—a course which, by the rule, the House generally discountenanced.

During the past week, the following progress has been made:—

Bills read a second time and committed:—Bury Corporation (Railways) Bill; Ystrad Gas and Water Bill.

Bills reported: Newark-upon-Trent Water Bill (preamble not proved); Walsall Corporation Bill (from the Select Committee on Police and Sanitary Regulations Bills).

Bill read the third time and passed: Pontypool Gas and Water Bill.

In regard to petitions, four have been presented against the Ystrad Gas and Water Bill (Lords), by (1) the Cymmer Colliery Company, (2) Rhondda and Swansea Bay Railway Company, (3) Ystradyfodwg Local Board, (4) H. J. H. Lawrance and others; while the Referees have disallowed the petition of the Partick, Hillhead, and Maryhill Gas Company, Limited, against the Glasgow Corporation Bill, except as against Part III. of the Bill and so much of the preamble as relates thereto.

HOUSE OF LORDS COMMITTEE.

Monday, March 24.

(*Before the Earl of* BELMORE, *Chairman; the Earl of* LAUDERDALE, *Lord* ZOUCHE OF HARYNGWORTH, *the Marquis of* ORMONDE, *and Lord* SAYE AND SELE.)

BRADFORD WATER BILL.

This Bill, by which the Bradford Corporation seek the necessary authority to carry out what is known as the Nidd water-works scheme, and which, it is calculated, will involve an expenditure of £1,230,000, came before their Lordships to-day.

Mr. POPE, Q.C., Mr. LITTLER, Q.C., and Mr. BALFOUR BROWNE, Q.C., appeared for the promoters of the Bill; and the opponents were represented as follows:—The Knaresborough Local Board, by Mr. BIDDER, Q.C., and Mr. BATTEN; the York City Council, by Mr. CRIPPS, Q.C., and Mr. FITZGERALD; and the York New Water-Works Company, by Mr. PEMBER, Q.C., and Mr. ERSKINE POLLOCK.

Mr. POPE, in opening the case for the Bill, said that Yorkshire communities were peculiarly circumstanced for water supply, not only for domestic purposes, but also because pure water of a soft quality was essential to the manufacture of woollen fabrics, and the copiousness of that supply was also, as might be supposed, an important desideratum. In 1853 the Corporation promoted a Bill for the improvement of the water supply, in competition with a Bill promoted by the Water Company. In that year both Bills were rejected by Parliament; no doubt upon the ground which Parliament usually adopted in such cases—that there should be some agreement come to between the existing interests and those of the Corporation. In 1854 another Bill was promoted, resulting in the acquisition by the Corporation of the water-works. In that year the area of supply was 6500 acres; the population being 104,000, and the revenue derived from the water supply about £10,000 a year. By the year 1889 the 6500 acres had been increased, by various Acts of Parliament, to 75,897 acres; the population had grown to 439,000; and the income had risen to £118,000 a year. The present daily water requirements amounted to 13,456,000 gallons, to meet which the total available quantity of water was only 10,250,000 gallons per day, which showed a deficiency of 3,205,000 gallons, taking no account of increased demands in the future, which ought to be provided against for the next ten or twenty years. The Corporation had gone carefully into various suggested schemes, and had consulted the best engineering authorities; and the present scheme was put forward as the very best possible one that could be laid before the Committee. Counsel then dealt with the petitions which had been lodged against the Bill. As to the opposition of Knaresborough, the Engineer to the Local Board admitted that the quantity of their water supply would not be reduced by the Bradford scheme; and on the question of quality, where there was a difference of opinion, Dr. Tidy would tell the Committee that the water which Knaresborough would obtain would be better if anything than that received by Bradford. With regard to the York objections, Counsel pointed out that the water supply of York was at present drawn from the River Ouse, at a point above the city, by pumping-works belonging to the Water Company; and the river received the drainage of 844,000 acres.

Witnesses were then called in support of the Bill.

Alderman *Smith Feather* gave evidence to show that the present water supply was inadequate for the wants of the population, and that for the purposes of Bradford trade a pure and additional supply was indispensable.

Mr. *A. R. Binnie*, Chief Engineer to the London County Council, and for the past fifteen years Water Engineer to the Bradford Corporation, deposed that up to the present time the Corporation had incurred an expense of £2,250,000 to acquire a good supply of water. It was dealt with principally by means of gravitation. Half the water was used for domestic, and half for manufacturing purposes. Having given evidence in regard to the growth of the population, and enumerated the various extensions of the works which had been carried out by the Corporation since the undertaking came under their control, witness detailed as follows the sections into which the Nidd scheme was divided:—(1) A storeage and compensation reservoir at Gouthwaite Hall, which will be managed by a board of millowners. (2) A storeage and distribution reservoir at Angram, on the River Nidd. (3) A similar reservoir near Haden Carr. (4) Another similar reservoir near Woodale—all the foregoing works being in the parish of Kirkby Malzeard. (5) An aqueduct conduit from the Nidd near Stone Beck Up, in the parish of Kirkby Malzeard, to the existing Chelker reservoir. (6) An alteration and enlargement of Chelker reservoir. (7) An aqueduct conduit from Chelker reservoir to a reservoir to be built at Morton. (8) A storeage and distribution reservoir at Morton. (9) An aqueduct conduit from the Morton reservoir to the existing Heaton reservoir. (10) An aqueduct conduit connecting the conduit from Chelker reservoir to Morton reservoir with Holden Beck, in the township of Silsden. (11) An aqueduct conduit connecting the conduit from the Nidd to Chelker reservoir with Barden Beck. The total length of the works was about 42 miles. The valley of the Nidd was composed of the millstone grit formation; and this was about one of the best gathering grounds obtainable for the purpose. The total supply afforded by the new scheme would be 17½ million gallons per day. The height of the bank of the Angram reservoir was 120 feet. The water area was 62 acres; and the capacity 644 million gallons. The height of the embankment of the Haden Carr reservoir was 120 feet; and the water area 82 acres—the capacity being 688 million gallons. The height of the embankment of the Woodale reservoir was 118 feet; the water area 83 acres, and the capacity 860 million gallons.

Tuesday, March 25.

Mr. *Binnie*, continuing his evidence this morning, said that the Gouthwaite compensation reservoir was nearly 300 acres in area. Its embankment was 52½ feet high, and about 300 yards long. The reservoir would contain 180 days' supply, which would carry the millowners over any period of drought. All the other reservoirs would also contain 180 days' supply of water. As to the quality of the water, as early as the year 1886, an examination was made of the Nidd Valley on behalf of the Leeds Corporation, who had it in view as a water-drainage area; and it was then decided beyond dispute that the Nidd water was thoroughly pure. Under his own supervision, daily samples of water had been taken in the proposed drainage area for a whole year. For 257 days the flow of the river was clear, bright, and colourless, and without sediment of any kind. On eighty-six days it was slightly tinted, as any stream flowing from a Yorkshire moor would be. During the whole year only on 22 days was the river at all discoloured; but not even then to such an extent as he had seen the water in the existing drainage area. Knaresborough had a decreasing population. Its water was pumped from the River Nidd at Knaresborough by means of a water-wheel. The water was filtered, and then pumped up to a small service reservoir. The water-wheel was not always able to work, and was sometimes, in flood time, drowned out. Any modification of the floods would enable the Knaresborough people to work the water-wheel more continuously Measured by the river, York was 52 miles below the Gouthwaite compensation reservoir. The total drainage area available for York was 844,000 acres, of which Bradford proposed to take 18,000 acres. The total population within the watershed of the York Water Company was 93,856. The whole cost of the proposed new works, including the price of the land, would be £1,114,446, to which was added £95,554 for contingencies; making a total of £1,210,000, Adding to that £20,000 for parliamentary and law expenses, made the total £1,230,000. The population in the district to be supplied was about 439,000. The scheme was sought to be undertaken not as a commercial speculation, but as a duty to the community. About 1,000,000 had been expended within the last fifteen years; but the Corporation had not been able to even keep abreast of the demand. It had been one dreary succession of water famines and periods of limited supply. The scheme when completed would increase the supply by 17½ million gallons a day. This, it was hoped, would provide for fifteen or twenty years to come. It was not proposed to construct all

the three reservoirs at once, but to proceed gradually after the whole of the compensation works had been finished.

In cross-examination, witness said the present daily consumption of water inside the borough was 4,178,000 gallons. Ten years ago it was estimated at 24 gallons per head; and it had now, with the restrictions, fallen to an average of 17½ gallons, but in many cases it was only 5 or 7 gallons. The reservoirs, which were full now, had a total storeage capacity of 1300 million gallons. Under the Act of 1878, an expenditure of £500,000 was made in enlarging the distributing mains, so it could not be suggested that the insufficiency of supply was caused by the pipes being too small. It was proposed to intercept the Burn Gill; but it was to be intercepted by the compensating reservoir. He was aware that the capacity of the compensation reservoir was not 1510 million gallons—the amount proposed to be given—but the Corporation, he pointed out, could not touch a drop of water under the Bill until the compensation water amounted to that quantity. Had the Grimwith scheme been adopted by the Corporation, he would have retired from advising them. He was aware that Knaresborough had had the right for a great number of years to use the water of the River Nidd; but he was not aware that any other person was prohibited from erecting works for taking water from the river to the prejudice of Knaresborough. Something like 1500 acres was the amount of peat land in the area proposed to be taken. This embraced 2 per cent. of the drainage area of York; and the water taken was 5 per cent. There was no time fixed in the Bill for the completion of the works.

The remainder of the day was taken up by the evidence of manufacturers carrying on business in the borough, who all testified that the success of the town depended on an additional supply of pure water being obtained.

Wednesday, March 26.

On the resumption of the proceedings this morning,

Mr. *G. J. Symons*, F.R.S., Secretary to the Meteorological Society, deposed that the mean rainfall in the Bradford drainage area was 56 inches. Taking the measurement of the ground at 18,000 acres, with that amount of rainfall, it would amount to 35 million gallons a day. In the matter of compensation water, the Bradford Corporation had always been very liberal. The Nidd was certainly not the largest tributary of the Ouse. He had known York for a long time, and knew the levels of the Ouse. Until 1885 only specially high floods were recorded. Subsequently data were taken for nearly every day. The floods rose to about 13 feet in high flood times. So far as flooding was concerned, the proposed works would absolutely do good to York.

Professor *Green*, F.R.S., Professor of Geology at the Oxford University, stated that from the geological condition of the district, he could apprehend no danger whatever to the proposed works; and he had no doubt water-tight dams could be well constructed. The rock under the three reservoirs was composed mainly of shales, with three thin beds of limestone. From observations he had made, however, and careful investigations, he was convinced that the limestone beds were impermeable.

Dr. *C. Meymott Tidy* stated that he was called in by the Bradford Corporation to ascertain the quality of various waters. There were two schemes before the Corporation at the time he was engaged—the Grimwith and the Nidd. On examination he found that the former was practically out of the question; and that the latter was incomparably the better. The water which would be supplied to Bradford from the new area would have a hardness of about 3°. The compensation area was singularly clear; and it was much freer from peat than the Bradford drainage area. The average of the organic matter in the streams of the compensation area was less than the organic matter in the streams of the Bradford area.

Dr. *Odling* said he had examined the proposed supply; and he considered it a suitable one for Bradford.

Mr. *Charles Gott*, C.E., of Bradford, averred that it would be impossible to promote any scheme for Bradford to which objections could not be raised by neighbourhoods affected. This particular scheme was free from any kind of serious objection so far as he could see. There was no possibility of obtaining new supplies of water anywhere near Bradford. All the local supplies had failed, or had become contaminated by the increased population.

Mr. *G. H. Hill*, C.E., stated that he considered the proposed scheme was very well laid out. The advantage to Knaresborough would be that, while it now in summer-time received a small quantity of water, which was heated in passing over the river bed, it would receive a larger quantity of cooler water.

Mr. *T. Hawksley* deposed that he had been adviser to the Bradford Water Company and to the Bradford Corporation since about 1853. The mode of compensation adopted in this scheme had great advantages, because the construction of a large compensation reservoir had the effect of diminishing the floods and relieving the droughts. The scheme would be beneficial to Knaresborough. There was no need for the York Water Company to apprehend any injurious effect from what the Bradford Corporation were doing at the top of the Nidd. They were 52 miles away.

Mr. *J. Mansergh*, C.E., said he had visited the drainage area of the proposed scheme. His opinion was that it would not be prejudicial to the water supplies of Knaresborough and York.

Sir *Frederick Bramwell* and Mr. *Fenwick* gave corroborative evidence. This closed the case for the promoters.

Mr. CRIPPS then called his witnesses for the York Corporation.

The *Lord Mayor of York* (Mr. Joseph Agar) said that the population of York was over 60,000. Large quantities of corn were brought up the Ouse every day; and the York City Council as trustees of the navigation received the income. There was no competing railway; and, therefore, it was very important that nothing should be done to injure the navigation.

Mr. *J. F. Vernon-Harcourt*, C.E., deposed that the state of the channel of the Ouse for navigation purposes was dependent upon fresh water coming down the Ouse, because the water coming up on the flood tide from the Humber was so very much charged with silt that the river bed would be raised by the silt if the descent of fresh water was affected. There was a tendency to form a bar just where the tidal action ceased. The winter floods swept out the accumulation that arose in the summer; and the summer floods helped to keep the accumulation down.

After further evidence of a similar character,

Mr. *Creer*, C.E., City Engineer and Surveyor of York, said that the whole area proposed to be dealt with by the Bill amounted to about 44 square miles. This was about 3¼ per cent. of the total drainage area of York. Taking into account the rainfall, he made out that the proportion of water supply appropriated in the Bradford drainage area was 3¼ per cent. of that of the whole of the Ouse basin. In addition to this, Bradford appropriated, for compensation purposes, 1½ per cent. of the total supply of the whole drainage area; so that altogether it was proposed by the Bill to appropriate 4¾ per cent. of the rainfall of the Ouse basin. The abstraction of so much pure soft water would increase the hardness and impurity of the water at York.

Thursday, March 27.

On the re-assembling of the Committee this morning,

Mr. *G. F. Deacon*, M. Inst. C.E., Water Engineer of Liverpool, stated that he had examined the site of the proposed works and into the question of the Ouse navigation. It was important that the volume and velocity in the water of the Ouse should not be diminished. The regulation of the flow of the river in summer time would not have so good an effect on scouring the river as summer floods would have. The minimum loss of scour under the proposed scheme, he calculated at 10 per cent. As to the scheme generally, he thought it was not laid out in the best manner to utilize the large acreage. The 56 inches of rainfall ought to realize, he thought, more than 15 or 16 million gallons of water a day.

Sir *Joseph Bazalgette*, C.E., and Mr. *Marten*, C.E., gave evidence to the effect that the proposed scheme would have an injurious effect on the navigation of the Ouse.

Mr. CRIPPS then addressed their Lordships on behalf of the Corporation of York. In the course of his argument, the learned Counsel said it must be remembered that an appropriation if allowed would be an appropriation as against York for all time of 18,200 acres. Bradford knew nothing of the York watershed, and nothing of the wants or desires of York as to the navigation. The promoters of the Bill did not propose to supply people in the district whence they were abstracting the water. They said they could obtain 17 million gallons a day from the area; and they wanted it not for domestic purposes, of which they had an ample supply at present, but for trade supply. They proposed to sell it in bulk at 8d. per 1000 gallons, or a sum of £583 a day. York did not want to stand in the way of Bradford getting more water, so long as it did not affect York; but they were coming as a trading concern, and, as between Bradford and York, it was a case of trade against trade, that was the issue between them. The scheme was a very expensive one, and Bradford could have gone elsewhere and obtained a sufficient supply at considerably less cost.

Witnesses were then called for the Knaresborough Local Board.

Mr. *Basil T. Woodd* stated that he thought the proposed scheme took the best water, and would leave Knaresborough with a very deteriorated supply. There was no necessity for the Bradford people to come into the district to abstract water; and he did not think they had a right to do so, and obtain a supply for trade purposes. He was of opinion that they ought to supply his district before taking away their water. The population was about 5000. The Local Board made a proposal to the Bradford Corporation that they should lay down a pipe and supply Knaresborough with 240,000 gallons a day. [Part of the correspondence between the Local Board of Knaresborough and the Corporation of Bradford, with reference to this proposal, was then read.] Witness further stated that they would have been willing to pay £150 a year to the Bradford Corporation; this being the estimated cost of their present pumping-station at Knaresborough.

Mr. POPE, in reply to the Chairman, said it would not have been possible to carry out this arrangement in the present Bill.

Mr. *J. Bailey Denton*, C.E., said he thought the proposed scheme would be very beneficial to Bradford and injurious to Knaresborough—injurious because it proposed to take away the very purest water from Knaresborough, and not to replace it.

Mr. *William Dalton*, F.R.G.S., gave an account of the geological conditions of the district, and his idea was that the site for the works was not a proper one.

Dr. *Dupré*, F.R.S., said he had come to the decided conclusion that the appropriated area was superior as a collecting ground for water to what was called the compensation area. The appropriated area was all moor land, while the compensation area included a good deal of manured and inhabited land.

Dr. *Whitelegge*, Medical Officer of Health to the West Riding County Council, considered that the Bill must have an injurious effect on the water supply of Knaresborough. The water in the Bradford area was the purest; but the water in the compensation area was not so pure.

Friday, March 28.

Mr. BIDDER this morning addressed their Lordships on behalf of the Knaresborough Improvement Commissioners. The learned Counsel argued that there was no necessity for Bradford to go into their watershed. Dealing with the financial part of the question, he said the total amount proposed to be spent by Bradford was £1,250,000. When all the works were completed, there would be a supply of 17½ million gallons of water a day. The revenue in the past year was more than £118,000. This was received by the sale of 10¼ million gallons; consequently the sale of the 17½ million gallons would produce £210,000, or deducting salaries and wages (say), £200,000. That was to say they spent £1,250,000 and obtained a revenue of £200,000. This worked out to 16 per cent.; while they borrowed the money at 3½ per cent. He would ask their Lordships to give Knaresborough as good a supply as they had now, and provide a pipe, at an expense to the Commissioners of £150 a year, which they were quite ready to give.

Evidence on behalf of the York New Water-Works Company was then taken.

Mr. *J. F. Taylor*, Chairman of the Company, said that the Company

was formed as long ago as the year 1846. The district supplied by them included York and several villages, comprising a population of 80,000, which, owing to the railway works at York, showed an even increase of nearly 4000 a year. He viewed with considerable apprehension the proposal of Bradford to take the water of the Upper Nidd, which was the best which came down the York watershed. His apprehension was increased by the intention of Leeds to absorb another large share of the York watershed.

Mr. *A. H. Allen*, Public Analyst for the West Riding of Yorkshire, said that he had taken samples of water from the Grimwith district; and he accepted the analysis which Dr. Tidy had made of water from the Nidd district. Dr. Tidy was fully justified in saying that there was no distinction on the ground of health between the Grimwith and the Nidd waters.

Mr. *T. Stevenson*, M.D., of Guy's Hospital, stated that the Grimwith supply seemed to be a good water for domestic purposes and for trade use.

Dr. *S. W. North*, Medical Officer of Health for York, said he was of opinion that the abstraction of the Nidd water from the York watershed would deteriorate the quality of the water supply of York.

Mr. *C. Hornsey*, land agent and surveyor, said he had examined the site of the compensation reservoir; and he produced figures showing that it would not hold as much water as had been estimated by the promoters.

Mr. *Marten*, C.E., gave some statistics as to the population and water supply of Bradford. He said, taking the same ratio of increase that had been going on in the population, he estimated the amount of extra water required in 60 years would be something like 15 million gallons per day; so that the present scheme would be sufficient for a period 60 years hence.

Sir *Joseph Bazalgette* confirmed the evidence of the preceding witnesses.

Mr. PEMBER then addressed their Lordships on behalf of the Company, arguing that Bradford should not be allowed to come to this watershed unless there was absolute necessity for it, and inability to go anywhere else. He contended that the scheme was extravagant, needless, and inconsiderate.

Mr. POPE having replied on the whole case, the Committee-room was cleared. After a short interval, the parties concerned were readmitted.

The CHAIRMAN said that the Bill might proceed, subject to the following conditions:—(1) That if at any time the Corporation take more than 17 million gallons of water a day, they shall give a corresponding additional compensation; and (2) that the Manchester clause shall apply to the town of Knaresborough.

The clause referred to in the decision of the Committee is to the effect that any corporation, authority, or company shall be at liberty on notice (after the works of the Bradford Corporation are completed) to demand and take water from the works, subject to such payment as may be agreed upon, or, failing agreement, a sum equal to 4 per cent. upon such proportion of the total capital from time to time expended as the daily quantity of water demanded by such authority may from time to time bear to the total daily quantity of water which the works so constructed are from time to time capable of conveying from the Nidd Valley into the water supply of Bradford, together with a proportion of the gross sum of £4000 a year, calculated in a like manner, as an additional sum by way of contribution to the necessary costs of management and maintenance. It is also provided that the Bradford Corporation shall not be compelled to give such supply so long as there may not be left for the inhabitants of the borough 25 gallons per head per day.

Thursday, April 24.

The Committee met again to-day for the discussion of clauses.

Mr. BALFOUR BROWNE, reminded their Lordships that on the last occasion they had decided that the Bill might proceed subject to these conditions; First, that if at any time the Bradford Corporation should take more than 17 million gallons a day from the proposed source of supply, they should in that case give a corresponding additional compensation; and, second, that the Manchester clause should apply to the town of Knaresborough. There was a little difficulty in drawing a clause to carry out the first part of the decision.

Mr. BIDDER said his clients would assent to the insertion of the Manchester clause.

Mr. BALFOUR BROWNE proceeded to say that the Corporation were willing to bind themselves never to take more than 17 million gallons on any one day.

The CHAIRMAN: I think we had better keep it in the form in which the Committee left it.

Mr. BROWNE: We cannot do that in the clause.

The CHAIRMAN: We understand that you are not going to construct the whole of your works at once?

Mr. BROWNE: The whole powers in our Bill will only enable us to supply 17 million gallons a day.

Mr. POLLOCK pointed out that there would be a difficulty in putting down gauges which would prevent the quantity being more than 17 million gallons a day.

Mr. BROWNE said the promoters proposed to put in words which would prevent them taking more than 17 million gallons; and the regulation would be left to a hydraulic engineer appointed by the President of the Institution of Civil Engineers. Of course, if, at the end of the thirty years or so, they came to Parliament to ask for further powers of supply, then they would have to give more compensation. In answer to a member of the Committee, he added that the gauge to be adopted would not only test the quantity, but would prevent the outflow being more than 17 million gallons.

Mr. POLLOCK asked that the York Water Company should be represented on the Board controlling the compensation water.

The Committee decided to accept Mr. Balfour Browne's clause and to give the York Water Company two representatives on the proposed Board.

The clauses of the Bill were then gone through and amended accordingly.

MISCELLANEOUS NEWS.

THE BOARD OF TRADE INQUIRY INTO THE RAILWAY RATES FOR MERCHANDISE.

(*Before Lord* BALFOUR OF BURLEIGH *and Mr.* COURTENAY BOYLE, C.B.)

The Classification of Gas-Works Materials.

After the visit of the Commissioners to Ireland, as mentioned in last week's issue, the hearing of objections to the revised classification of merchandise traffic proposed by the railway companies, under the Railway and Canal Traffic Act, 1888, was resumed in London, on Thursday, the 24th ult. Nearly the whole of the day was devoted to the goods suggested to be entered under Class C which were not dealt with at the previous sitting, and which had not any direct interest for gas managers. Class 1 was also touched upon; but the only articles dealt with were in the fruit line.

On the following day, in accordance with an arrangement arrived at on the preceding afternoon, the parties proceeded to discuss the general term and classification of

Hardware.

Mr. IMPEY, on behalf of the Birmingham District and Railway Canal Trades' Association, strongly urged the retention of the comprehensive term "hardware" on the ground of its convenience. There were, he said, some 250 different articles which properly came under this description; and he asked that they should be placed in Class 1. About 150 of them had always been conveyed by the railway companies as hardware, and appeared in the Railway Clearing House classification under that heading. The railway companies desired to sweep away this general term, and to scatter the goods known by this definition over three or four separate classes. If this proposal were adopted, it would be almost impossible for manufacturers to carry on their business. The railway companies suggested that many of the hardware goods should be put in Class 3; but when these were forwarded in packages or cases (he was not, of course, referring to single articles sent lose), he urged that they should be included in Class 1. The proposals of the railway companies would add at least 47 or 50 per cent. on their rates.

Mr. HICKMAN supported Mr. Impey's argument, and submitted that there was no practical difficulty in the definition of hardware. What the railway companies described as "hollow-ware," he also maintained should be treated as a species of hardware.

Mr. J. MARSTON, the Mayor of Wolverhampton, pointed out that there were a number of metal articles proposed by the railway companies to be comprised in Class 5. If this were permitted, it would mean simple ruination to a portion of the trade of his town. Metal articles, in his opinion, should be classed as hardware, and carried at the hardware rate. They were inexpensive goods, made chiefly from wrought and cast iron.

Mr. COURTENAY BOYLE: Do you now refer to such articles as gas chandeliers?

Mr. MARSTON: They are made of brass, and should certainly be classified as hardware.

Mr. COURTENAY BOYLE: It is rather a strong request for them to be put into Class 1.

Lord BALFOUR of BURLEIGH: Had you chandeliers and gasaliers in your mind, when you asked that hardware should be put in Class 1?

Mr. MARSTON: I do not see that I can distinguish chandeliers and gasaliers from gas-fittings, as they are packed into a small space. All gas-fittings are now forwarded as hardware.

Lord BALFOUR of BURLEIGH: Chandeliers and gasaliers, I think, are classified as furniture at present.

Mr. MARSTON: They generally go as fittings.

Lord BALFOUR of BURLEIGH: If you get the classification as you propose, and every trader had the right to send anything he liked as hardware, he might fit up gasaliers in their complete state, and not send them as fittings, and demand that they should be consigned as hardware.

Mr. MARSTON said he thought his Lordship was alluding to large gas chandeliers which took up an immense amount of room, and were conveyed at a special rate. Chandeliers were rather exceptional; there was not the same amount of dealing with those that there was with the general hardware he had been speaking about.

Mr. BEALE, on behalf of the railway companies, speaking of the proposal to name "hardware" as a generic term without any definition, said that their past experience had been that the term, having been adopted in one Act 45 years ago, had been discarded as impracticable ever since. To place "hardware" in a parliamentary classification without any definition of it, would simply lead to every kind of difficulty and litigation. Therefore to adopt the term would be injurious to both the railway companies and the traders. Moreover, to transfer all the goods from Class 3, in which they had been placed, to Class 1 would be very unfair to the railway companies. As to the question of the classification of goods like chandeliers, the Birmingham trade expressly asked that they should be reduced from Class 5 to Class 1; and to this proposal he greatly objected.

Lord BALFOUR of BURLEIGH remarked that this matter which they had been discussing was one of the largest questions on the subject of classification they had had before them; and they would later on give some indication of their views thereon.

Among other articles subsequently mentioned were light *Iron and Steel Castings* and *Gas-Fittings*, in parts (except brass and copper tubing) packed in casks, cases, or crates; and these it was admitted, would come under the general heading of "hardware."

Grates, Ovens, and Stoves (polished).

Lord BALFOUR of BURLEIGH said he should like to point out with regard to these polished grates, &c., that, if they were to place them in the hardware list, someone interested in unpolished goods of a similar character would say that he was very badly used, because obviously

the half-finished articles should go into a lower class than the polished ones.

Mr. IMPEY observed that these goods were usually sent packed; and so there was very little additional risk in the transit of polished than unpolished goods.

The Court afterwards adjourned to Monday of last week.

THE LONDON COUNTY COUNCIL AND THEIR WORK.

Lord Rosebery's Review of the Past Year.

The Weekly Meeting of the Council of the Administrative County of London was held last Tuesday, when Lord ROSEBERY continued his review (commenced at the previous meeting) of the work of the different Committees having charge of the several departments of the Council.

The first Committee referred to was the Sanitary Committee, which—from the multiplicity of its functions and their domestic character—his Lordship called "the nurse of London." Some of its varying duties were indicated by the heads of the report the Committee had presented—viz., "Public Health (London) Consolidation Bill, bye-laws, medical officers of health, public baths and laundries, châlet accommodation, fogs, water supply, Railway and Canal Traffic Act, coroners' notification of infectious diseases, ambulances, gas supply, testing of gas-meters, weights and measures, licensing cowhouses and slaughterhouses, supervision of offensive trades, Explosive Acts, Petroleum Acts, Infant Life Protection and Prevention of Cruelty to Children Acts." He was sure that the members would feel that it was not possible for him to go through these heads in detail; but a cursory review was necessary on one or two of them. In the first place, the Committee thought their powers were very inadequate; they had found them very inadequate. They said that the sanitary administration of the Metropolis was in a completely and entirely unsatisfactory state, and they wished strongly to emphasize their opinion that the London County Council should be empowered to frame bye-laws for the proper sanitary government of London; that the new District Councils, or the existing local bodies, should put them in force; and that the County Council should be the supervisory body to see that they were properly carried out. He believed that to be a sound recommendation. In regard to fogs, which was a subject on which they had built some hopes, they found that it was impossible to make any practical suggestion. As a matter of fact, the only existing legislation on the subject was in the Smoke Abatement Acts, which provided that engines and furnaces and buildings used for trade should consume their own smoke. But there was no enactment with respect to the smoke of private houses; and in any case the police were entrusted with the enforcement of these Acts, and they had no control over the police for that or for any other purpose. Concerning the gas supply, which was one of their most important functions, they had the whole gas-testing for London except at the City stations; and they had endeavoured to make considerable improvements in this examination. To make it more real and more thorough, they had endeavoured to persuade the Board of Trade to introduce a Bill to legalize portable photometers, so that gas might be tested elsewhere than at the regular testing-places. He had no doubt whatever that no testing of gas could be efficient unless it was extended much beyond its present scope. They had, further, a large control of the explosives and inflammable materials of London. As regarded inflammable materials their duties were not very considerable, because they had only the power to sample petroleum on dealers' premises, so as to ascertain whether it was petroleum of the flashing point to which the Acts applied. But when they considered that the import of petroleum into London annually was not less than 2 million barrels of 40 gallons each, and that the number of fires proceeding from mineral oil lamps was very considerable—there being no less than 259 last year—he thought they must see that the Committee had some reason for urging that they should be given extended powers in that respect.

The next Committee dealt with was the Highways Committee, which was mainly concerned with business under three heads—main roads, electric lighting, and tramways. On the second head, Lord Rosebery remarked that the favourable terms of the Electric Lighting Act of 1888, as regarded length of tenure and conditions of purchase at the termination of tenure, as well as the advance of science, had led to a great development last year, which almost coincided with the coming into existence of the Council. The Council had been entrusted with great powers of supervision and control; and they had, he believed, last year 55 notices of application for powers from different companies. In every case he thought that they affixed special conditions, which had been complied with. This year they had had 23 Provisional Orders and three Bills, all of which they had considered, and which they had brought into line, as far as they could, with those that they gave last year. With respect to the Overhead Wires Bill, for the regulation and control of overhead wires, which was a matter of so much importance, they had withdrawn the clauses relating to subways, at any rate for the present.

After dealing with the reports of several other Committees, in whose work JOURNAL readers are not in any particular measure interested, his Lordship referred to the Special Committee on Water Supply. This Committee, he remarked, had submitted a report which was a very interesting record of the history of the question, drawn up by their colleague Mr. Beal; but, as a matter of fact, when they came to inquire into their subject, they found that they had no power to incur expense in connection with the inquiry as to the matter referred to them, and they had to put a special clause into the County Council Bill for obtaining money for the purpose. The clause was not favourably received by Parliament; and they were only able to renew it this year. This matter was a very urgent one. It was not so that they should obtain control of the Water Companies that the question was so urgent, but it was in view of the quinquennial valuation that took place next year. Now, the annual increase in rateable value of property in London, as the Committee pointed out, averaged about £1,500,000 at each quinquennial valuation. Taking the average authorized charge of the several Companies for domestic supply to be 5 per cent. on the rateable value, the increase of income to the Companies at each quinquennial revaluation would amount to £75,000 a year, solely in respect of the increased rateable value of existing property. The consequent increase in value of the Water Companies' stock would probably exceed £2,000,000; and that at each quinquennial valuation would probably be the very lowest increase which could be added to the value of these Companies. They would see from this statement that it would be after 10 or 15 years impossible for London to face the enormous expense of controlling its own water supply. He thought that the Committee were right to urge that a Bill should be brought into Parliament to deal with this question in the interest of the ratepayers, and in the interest of the Metropolis at large.

Lord Rosebery ended his review for the day by calling attention to the number of Committees that found their powers inadequate under present Acts of Parliament. Of course, it might be said that bad workmen quarrelled with their tools; and that it was the fault of the workmen, and not of the tools, that this discovery should be made. But he did not think that this view of the case would hold water for a moment. Why was the Local Government Bill made to apply to London at all? Simply to remedy the chaotic condition of things which existed in the Metropolis, which consisted of a city and fragments of three counties. It was quite clear that when they tried to reduce this chaos under a system—more especially by a Bill of universal application both to rural and urban counties—they could not help finding that a great deal of their machinery required renovation. That was the case on this occasion; and they were also well aware of the fact that their predecessors (the Metropolitan Board of Works), in part of their functions, repeatedly had to seek the assistance of Parliament, and very often in vain, to enable them to perfect their machinery. He thought that, on a calm survey of the whole situation, they would find that, with the machinery at their disposal, the Committees of the Council had done the best that could be done; and that Parliament would not long consider it unreasonable if they should apply for assistance in remodelling and resharpening the machinery with which they had to work.

THE GAS-TESTING ARRANGEMENTS IN SOUTH LONDON.

The County Council and the Peckham Testing-Station.

The London County Council, at their Meeting last Tuesday, had before them a lengthy report of the Sanitary and General Purposes Committee, and which was unanimously adopted.

In the course of the report, the Committee stated that they had had under consideration the action taken by the South Metropolitan Gas Company in cutting off the supply of gas to the testing-place at Hill Street, Peckham; thereby making it impossible for the official Gas Examiners to test the gas supplied to the district. Last year, the Peckham testing-place was closed for about four months, for the purpose of alterations in the testing apparatus prescribed by the Gas Referees; and the apparatus having, after the completion of the alterations, been examined and certified by the Referees, the testing-place was re-opened in September. The Company, however, took exception to the working of the apparatus, and cut off the supply of gas. Thereupon the Committee instructed the Solicitor to take action against the Company if possible; but the supply was again put on. On the 21st of November last, however, the Company again disconnected the supply until a more reliable form of photometer should be fitted at the testing-place. Having ascertained, says the report, that the Gas Acts did not contain provisions for summary proceedings, or the infliction of penalties in a case of this kind, the Committee, acting on the advice of the Solicitor, urged the Board of Trade to exercise a power given by section 45 of the Metropolis Gas Act, 1860, to move the Attorney-General to take action against a company "where the provisions of that Act have been violated or not complied with on the part of any gas company." After correspondence and interviews between the Board of Trade and the Company, the supply was reconnected on the 24th of March; but a return of low illuminating power having been made by the Council's Gas Examiner on the 8th of April, the gas supply was again cut off. The companies are, it is pointed out, required by statute to provide and maintain testing-places, apparatus, and materials as prescribed and certified by the Gas Referees; but no powers are given for enforcing this provision. It appears to the Committee that, in the present state of the law, the action of a gas company may at any time defeat the objects of the Gas Acts, and deprive the public of all guarantee of the quality of the gas supplied; and that it is thus desirable that measures should be taken to remedy this with as little delay as possible. Although they had addressed two letters to the Board of Trade, urging that the Attorney-General should be put in motion under the provision of the Act of 1860, the Board have not acceded to the request, but have simply asked the Company to re-establish the supply. The result is that since September last the Peckham testing-place has, except for two short periods, been without a supply of gas for testing purposes; and thus in a large area of the South Metropolitan Gas Company's district, consumers have been without the protection given by official testings. In these circumstances, the Committee considered that an alteration of the law was necessary, and recommended—"That the Board of Trade be requested to take the necessary steps for amending the Gas Acts applying to the County of London, with the object of making the Gas Companies liable to penalties where they fail to observe the requirements of those Acts as to the provision of official testing-places, testing apparatus, and other things necessary for the official examination of the gas supplied by such Companies."

Monte Video Water-Works Company, Limited.—The report of the Directors of this Company for the year 1889 states that the gross revenue amounted to £81,013, an increase of £6677. The working expenses show an increase of £7568; and the net income amounted to £49,645—as against £50,536. The Directors recommend a further dividend of 2½ per cent. (making 5 per cent., tax free, for the year) payable on May 15, placing £10,000 to the special reserve fund (raising it to £54,000), and carrying forward £1704.

THE SALFORD GAS SCANDAL.

The Application for a Royal Commission—The Reply of the First Lord of the Treasury.

A Deputation from Salford, conveying the ratepayers' petition to Parliament for an inquiry into the Salford gas scandal, waited upon the First Lord of the Treasury (Mr. W. H. Smith) at the House of Commons last Wednesday. The following report of what occurred was subsequently furnished to representatives of the Press.

The gentlemen present were: Messrs. Edward Hardcastle, M.P., H. H. Howorth, M.P., Lees Knowles, M.P., and W. Mather, M.P.; and the deputation consisted of Messrs. Mandley, G. Haworth, Bradford, and Wilson. Mr. Smith was accompanied by Mr. Matthews (Home Secretary) and Mr. Stuart Wortley, M.P. Messrs. Mandley and Haworth presented their case. The two main points urged were the advisability of inquiring into the legality and force of the so-called Hunter compact, and that a Commission would be the only tribunal which could adequately sift the serious charges made against Corporation officials. In referring to the Hunter compact, Mr. Mandley stated that he relied as to its invalidity upon the remarks which had fallen from the Judges. He had consulted his Solicitors, and had been advised that, till it was known what steps Parliament would take with regard to this petition, he should not proceed in a Court of Law.

Mr. SMITH stated, in effect, that the Government could not recommend Parliament to deal with the case, unless every legal remedy had been exhausted and failed. A wrong must, however, have its remedy. The question whether or not the compact was *ultra vires* could be more efficiently decided in a Court of Law than before a Commission appointed by Parliament. Before a Royal Commission could be granted for the purpose, without considering the difficulty of passing an Act of Parliament, it would have to be shown that there was sufficient evidence to justify its existence; that there was no other way of dealing with the alleged grievance, as for instance in a Court of Law; and that the case was one of urgency. The Metropolitan Board of Works inquiry, to which allusion was made, was a very exceptional inquiry. Moreover, definite and specific cases of malpractice by persons named were alleged, and since that inquiry legislation had resulted. Particularly an Act had been passed only last year under which it was made a criminal offence to offer bribes to officials and others. In the Salford case no names had been specifically mentioned; and the inquiry which had been asked for appeared to be in the nature of a fishing inquiry. If an ordinary Commission were granted, barristers would be appointed to hold the inquiry. Those barristers would not be of equal standing with judges; they would not have equal power with judges. They would not be able to give relief, or to order payment of sums of money found due to the Corporation or to individuals; and they might have difficulty in compelling witnesses to attend and in obtaining evidence. A Commission could not set aside the compact; whereas it could be set aside by the Court of Chancery. As to the cost of a Commission, that would have to be borne by the ratepayers or by the petitioners themselves. A roving Commission, to which reference was also made, would be at least equally objectionable. The remedy for the alleged grievance was in the Courts of Law; and petitioners might obtain it there. It was not for Parliament to teach the Salford ratepayers how to manage their own affairs. If they had managed them badly, and if they had had a grievance, they had at the same time a means of obtaining redress.

Mr. Gladstone and Mr. Ellis Lever.

In answer to a correspondent who called Mr. Gladstone's attention to some newspaper statements in reference to Mr. Lever's case, the right hon. gentleman, on the 23rd ult., wrote as follows:—"Dear Sir,—Undoubtedly it would be right for me in a case where the conduct of an individual had received such a condemnation as you have reported to me not only to withdraw any approval of such conduct, but to express my regret for having approved it. But in the present instance I have no evidence before me sufficient to show such an approval, or to show that, if given, it purported to be in any way founded upon knowledge, or to be more than such an acceptance as courtesy required (of course, a provisional acceptance) of any statement made by a person of presumed veracity and integrity. Ordinary sense and feeling would, I think, lead any person to congratulate either a friend or an acquaintance on the successful issue of a lawsuit; but I am not aware of ever having had, or professed to have, any acquaintance with the case."

A London correspondent of the *Manchester Guardian*, writing on Wednesday, said: A deputation representing the ratepayers of Salford waited upon the First Lord of the Treasury and the Home Secretary in Mr. Smith's private room at the House of Commons this afternoon. The original arrangement was that the deputation should consist of the three members of Parliament for Salford and of three representatives of the ratepayers of the borough. The three representatives of the ratepayers were Mr. Councillor Mandley, Mr. George Haworth, and Mr. Wilson. The deputation was, however, joined by Mr. Mather, M.P.; and, at Mr. Mather's suggestion, an addition was made to the representatives of the ratepayers in the person of Mr. Bradford. Mr. Smith and Mr. Matthews appeared, I am told, to be only very imperfectly informed upon the subject of the Salford scandals. They were not, for example, aware that the Corporation itself had sent a petition to Parliament praying that an inquiry might be granted. The fact of the matter seems to be that this petition had been dropped into the petition bag by Mr. Haworth, M.P., in the usual way, and the attention of the House and the country had not, therefore, in any special manner been called to its existence. It is hoped that the fate of the ratepayers' petition may be different; and I am informed that Mr. Hardcastle, M.P., has not only promised to make a public presentation of it at the sitting of the House to-morrow (Thursday), but has also consented, in view of the importance of the subject, to request that the petition may be read by the Clerk at the table. I regret to say that the deputation representing the ratepayers were far from being satisfied with the reception accorded by Ministers to the views which they were commissioned to lay before the Government for their consideration and acceptance. The Government are apparently disinclined to take up the subject; and unless pressure is brought to bear upon them from outside, and especially from the constituents, they will do nothing. All that Mr. Smith could suggest was that the ratepayers should bring an action against the Corporation for the purpose of annulling the agreement into which they have entered. The statement that Mr. Bradlaugh has determined to take up the question in Parliament is premature. The hon. gentleman is waiting to see what the intentions of the Government and of the members for Salford are in the matter. If both alike should fail in their duty, the hon. member for Northampton is, I understand, quite ready to act. What is necessary is that a Parliamentary Commission should be appointed, and that, in the first instance at any rate, the inquiry before this Commission should be confined to an investigation of the facts as they relate to the Salford Corporation. The proper precedent is that supplied by the Commission that was appointed to inquire into and report upon the working of the Metropolitan Board of Works and the irregularities which were alleged to have taken place in connection therewith. In 1888 an Act was passed which was entitled "An Act for Facilitating the Proceedings of the Commissioners appointed to Inquire into the Working of the Metropolitan Board of Works." By this Act it was provided that the Commissioners should have all such powers, rights, and privileges, as are vested in Her Majesty's High Court of Justice, or in any Judge thereof, on the occasion of any action in respect of the following matters:—(1) The enforcing the attendance of witnesses and examining them on oath, affirmation, or otherwise; (2) the compelling the production of documents; and (3) the punishing of persons guilty of contempt. All those who have studied the subject of the Salford scandal whose opinions I have been fortunate enough to obtain, are unanimous in holding the view that nothing short of the passing of an Act of Parliament on all-fours with the Metropolitan Board Commission Act of 1888 will satisfy the justice and the equity of the case.

The same correspondent, telegraphing on Thursday night to our contemporary, observed: Mr. Hardcastle, M.P., publicly presented at the sitting of the House of Commons this afternoon the petition of the ratepayers of Salford with reference to the gas frauds.* In former times it used to be a constant practice to make use of the occasion of the presentation of a petition to raise a discussion on the subject-matter with which the petition was concerned. This practice, however, was found to give rise to great inconvenience, and it has now become to all intents and purposes obsolete. Indeed, it is expressly forbidden by the Standing Orders of the House of Commons. By these Standing Orders, it is provided that "every member offering to present a petition to the House do confine himself to a statement of the parties from whom it comes, of the number of signatures attached to it, and of the material allegations contained in it, and to the reading of the prayer of such petition." Every petition is to be brought to the table by the direction of the Speaker, who, say the Standing Orders, shall not allow any debate or any member to speak upon or in relation to such petition; but it may be read by the Clerk at the table if required. An exception, however, is made even under the Standing Orders now in force in one particular instance. By Standing Order No. 80, it is laid down that, in the case of a petition complaining of some present personal grievance for which there may be an urgent necessity for providing an immediate remedy, the matter contained in such petition may be brought into discussion on the presentation thereof. It was to this Standing Order that Mr. Bradlaugh directed the attention of the Speaker this afternoon. It will be noticed that the Speaker in the course of his reply, while intimating that he did not think that the Standing Order applied in the present case, went on nevertheless to express the opinion that he thought the subject-matter of the petition might very properly on some subsequent occasion be brought under the consideration of the House. The Act of Parliament to which Mr. Smith referred in his answer to the deputation which waited upon him yesterday (Wednesday) was an Act which received the Royal Assent on the 31st of August, 1889, and was entitled "An Act for the more effectual Prevention and Punishment of Bribery and Corruption of and by Members, Officers, or Servants of Corporations, Councils, Boards, Commissions, or other Public Bodies." The enacting clause of this Act provides that every person who shall, by himself or by or in conjunction with any other person, corruptly solicit or receive or agree to receive for himself or for any other person any gift, loan, fee, reward, or advantage whatever as an inducement to or reward for, or otherwise on account of, any member, officer, or servant of a public body doing or forbearing to do anything in respect of any matter or transaction whatsoever, actual or proposed, in which the said public body is concerned, shall be guilty of a misdemeanour. Any person found guilty of such misdemeanour is liable to be imprisoned for any period not exceeding two years, with or without hard labour, or to pay a fine not exceeding £500, or to both such imprisonment and such fine; and, in addition, he is liable to be ordered to pay to such body, and in such manner as the Court directs, the amount or value of any gift, loan, fee, or reward received by him, or any part thereof, and to be adjudged incapable of being elected or appointed to any public office for seven years from the date of his conviction, and to forfeit any such office held by him at the time of his conviction. It must be admitted that the provisions of this Act of Parliament are of a sufficiently drastic character, and that they cover the offences for which Salford has recently acquired such an evil reputation.

The Allegations against Manchester Corporation Departments.—At the quarterly meeting of the Manchester City Council to-morrow, the Mayor (Mr. Alderman Mark) will submit a report in reference to the recently-published letter of Mr. S. Norbury Williams, in which he said that if the proposed Commission to inquire into the Salford gas frauds was extended to Manchester, and had power to "send for persons and papers," he would "undertake to bring before it witnesses and documents who will prove that in the case of two, if not three, departments of the Manchester City Council, bribery and corruption have existed, and done their nefarious work."

* See "Parliamentary Intelligence," p. 840.

SINGAPORE GAS COMPANY, LIMITED.

The Annual General Meeting of this Company was held last Wednesday, at the Cannon Street Hotel, E.C.—Mr. R. S. FOREMAN in the chair.

The SECRETARY (Mr. Robert King) having read the notice convening the meeting, it was, as usual, agreed to take as read the Directors' report and the statement of accounts for the half year ending Dec. 31 last. The former showed that after charging profit and loss account with the usual writings off, and adding £250 to the reserve fund, there remained an available balance for division of £1886 15s. 7d.

The CHAIRMAN said that, before commencing the business of the meeting, he had, with very great regret, to announce the sudden death of their late Chairman and friend (Mr. H. Palfrey Stephenson), who, as many of the shareholders were aware, had been connected with the Company from the very commencement, and who had always taken the greatest interest in its prosperity. In the few remarks he had to make prior to moving the adoption of the report, he would, in the first instance, refer to a suggestion made, as would be remembered, at the last general meeting, by one of the shareholders, with the concurrence of the other shareholders present on that occasion, and also with the full approval of the Board. It was to the effect that, in the event of a continuance of the late increased cost of coal, it might be desirable to recommend a reduced dividend rather than trespass further upon the Company's small reserve fund, which, as the shareholders knew, had not been very long established. The cost of coal carbonized during the past half year had been very high—abnormally so—yet showing a reduction of about 2s. per ton, as compared with the previous half year. Although the net profit of the six months had increased by about £588 in comparison with the June half year, and would therefore admit of the usual dividend, the Directors had considered it the more prudent course to advise a reduced dividend at the rate of 6 per cent. per annum, to add £250 to the reserve fund, and carry forward a small balance to the profit and loss of the current half year. He might here mention that the cost of coal for the present year contrasted favourably with that of the past year; their recent shipments having been effected upon much more advantageous terms. Besides this the coal strikes in New South Wales having terminated, the Australian market was now open to the Company for future supplies. Another market had also lately been opening up in Japan, where coal of excellent quality for gas purposes—reported by their Manager to be fully equal to the best Australian coal—could now be procured; and from the nearness of Nagasaki (the port of shipment), this coal could, the Directors believed, be most advantageously used and laid down on the works at a very moderate cost, thereby lessening the probability of the recurrence of the high price which had lately ruled. As to the gas and meter rental, he said that this showed some improvement over the previous and corresponding half years. This was owing to an increase of the public lighting; and a considerable further extension in this department was contemplated in the course of the present year. Products, profit on fittings, and sundries had likewise given good results; and he might also allude, as he had done on former occasions, to the care and regularity shown in the collection of the Company's accounts. With regard to exchange, the rate for the half year had been favourable; the dollar averaging 3s. 2¼d., as compared with 3s. 1d. for the preceding half. The amount standing in the accounts under the head of "loss on exchange" was certainly greater; but this was in consequence of the much larger remittances that had been received from Singapore. The last quotation was 3s. 4d. to the dollar; and in the event of the Silver Bill now before the American Legislature being passed in its entirety and becoming law, they might look for a still further considerable advance in the rate of exchange, which the Directors hoped would be of a permanent character, thereby affording a very welcome relief to those companies who like their own, derived their revenue from countries having a silver, currency. He next called attention to the fact that the large outlay which had lately taken place in the renewal of services was already beginning to show good results; the unaccounted-for gas having been reduced from 14 to 10 per cent.—a point much below which, with more than 40 miles of mains passing through a scattered district, they could hardly expect to reach. The Chairman concluded by moving —"That the report of the Directors, with the balance-sheet attached thereto be received, adopted, and entered on the minutes."

Mr. H. W. SMITH, in seconding the motion, said that those shareholders who had carefully examined the accounts, and who had heard what the Chairman had stated, would no doubt agree with him (the speaker) that no apology was needed from the Directors in advising the payment of the dividend recommended in the report. It had been his opinion, and that of his colleagues on the Board, that some steps should be taken to provide the means for meeting the varying circumstances to which the Company were subjected, and hence the departure they were making that day, in setting aside a portion of the revenue to a reserve fund. He was ambitious enough to desire to see something like £3000 or £4000, or even a larger sum than that, placed to the reserve fund. Such an amount as this would be a source of revenue if invested, or used as capital in the Company's business, and other advantages would also accrue. As to the profit and loss account, he thought that, comparing it with the one for the preceding half year, it bore a very favourable comparison; and the prospects with regard to coal, and also the saving they were likely to make under the head of unaccounted-for gas, enabled the Directors to predict a better result in the current half year. He hoped the shareholders would give the Directors credit for an endeavour to strengthen the resources of the Company; and, in his opinion, in twelve or eighteen months' time, they would see better than they could that day the great advantage resulting from not dividing the full profits earned.

The motion was carried unanimously.

On the proposition of the CHAIRMAN, seconded by Mr. R. RICE, a dividend was declared upon the ordinary share capital at the rate of 6 per cent. per annum, less income-tax.

The retiring Directors (the Chairman and Mr. Rice) were next re-elected.

Dr. KING having moved the re-appointment of Mr. W. T. Morrison one of the Auditors,

Mr. S. SPENCER took exception to his re-election, on the ground that he did not appear to have leisure to pay much attention to the work of the office; and (after a short discussion) he moved an amendment to the effect that Mr. B. Green be appointed to the office.

Mr. A. FEATHERSTONE seconded the amendment, which was carried *nem. con.*

Mr. C. Newton, the second Auditor, was then re-appointed.

Mr. GREEN thanked the shareholders for the honour they had done him. He said he had had some experience in gas companies' accounts, having been connected with the gas industry for the past 35 years.

The services of the Directors, the Secretary, and the Manager at Singapore (Mr. W. T. Batten) having been suitably acknowledged,

The CHAIRMAN intimated that a gentleman was present from the firm of Messrs. C. and W. Walker, the contractors for the new gasholder and tank; and he might be able to give the shareholders his opinion thereon.

Mr. FEATHERSTONE said that Messrs. Walker sent out to Singapore some workmen from their staff to erect the Company's new gasholder. He believed the contract was carried out entirely to the satisfaction of the Manager of the works; and the holder was now working very well indeed. The crown of the other gasholder had been re-sheeted, and put in excellent condition; and these two holders would, in his opinion, run another 20 or 30 years without a shilling being spent on them. Great credit was due to the gentleman who designed the new holder; and he thought he might take a small share to the contractors.

This concluded the proceedings.

INCANDESCENT GASLIGHT COMPANY, LIMITED.

In order to comply with the Articles of Association, it is necessary that the annual meeting of this Company should take place not later than April 30; and in accordance with this requirement, the shareholders were called together last Wednesday, at the Cannon Street Hotel. No report or accounts, however, were presented, as Messrs. Price, Waterhouse, and Co., the Auditors, had been unable to complete their scrutiny of the latter, "owing," they wrote, "to the incomplete state in which the accounts had been left by the late book-keeper." It was therefore agreed to adjourn the meeting *sine die*. An extraordinary meeting was afterwards held, at which it was resolved, on the proposition of the new Chairman (Admiral Inglefield), (1) to cancel the special resolutions Nos. 1, 2, and 3, passed and confirmed at meetings held on Jan. 30 and Feb. 14 last (see succeeding issues of the JOURNAL); (2) to reduce the capital from £500,000 to £41,000, divided into 40,000 ordinary shares of £1 each, and 10,000 preference shares of 2s. each, and to effect this reduction by cancelling the 7101 shares surrendered by the vendors, and other shares specified in the resolution; and (3) to give to the holders of the preference shares a title to nine-tenths of the profits each year, and in the event of the liquidation of the Company one-half of the surplus assets, and the remaining profits and surplus assets to the other shareholders, "provided that such preference shares shall only be issued in accordance with the fourth resolution passed and confirmed at the meetings held on Jan. 30 and Feb. 14, 1890, except that the words 'not being later than June 1, 1890,' in such resolution, shall be treated as expunged." The suggestion to delete the words "not later than June 30" provoked some discussion. One shareholder —Mr. Questel—thought that if these words were erased, it would open the way for the Directors, if they saw later on that the business was prospering, to issue the remaining preference shares (entitled to nine-tenths of the profits), and being "in the know," they could easily arrange to allot these to themselves or their friends. He moved, as an amendment—"That any preference shares that remain unallotted shall not be allotted until they have been first offered *pro rata* to the original subscribers." Mr. Rickards, the Company's Solicitor, stated that they proposed to expunge the words in question in case the necessity should arise for further capital; but such a contingency they did not anticipate, as they had ample money for the purposes of the business. The amendment was ultimately withdrawn on the Chairman assuring Mr. Questel that the Board would not issue further shares without giving the shareholders an opportunity of applying for them. The discussion elicited from the Chairman that the Board were doing everything possible to reduce expenditure. They themselves had accepted a very small allowance in the way of fees. The extravagant outlay on their branch establishments had been stopped by dispensing with some of them, and establishing agencies instead. They also intended giving up their expensive offices at Westminster, and having an office on the works. The savings they had already effected would amount to about £5000 a year. He added that the lamp had now been so improved that it did not require an expert to fix it; this could be done by any one of ordinary intelligence. The Chairman was then interrogated by Mr. Knight with regard to the position of the litigation between the Company and Mr. Mactear, the late Technical Director; but he would not impart any information on the subject. Mr. Trinder, who is acting as Solicitor for Mr. Mactear in the matter, however, stated that they had put certain propositions before the Board, which they had rejected; and so the action would come on for trial in the ordinary course. The Chairman observed that the proposals were such that the Board could not for one minute entertain them in the interests of the shareholders.

Gas Cookery Lectures at Nelson.—The Nelson Local Board Gas Committee opened a series of lectures on cookery with the aid of gas-stoves, in the Queen's Hall, Nelson, on the 22nd ult., and three following days. The lectures were given by Miss Sophie Thwaites, of Liverpool; and each lesson was very instructive, and was listened to by a large and attentive audience. The Gas Committee have expressed themselves as thoroughly satisfied that the lectures have proved a success; for during their progress they received orders for more than £250 worth of cookers.

LOCAL AUTHORITIES AND ELECTRIC LIGHTING.

Important Concessions by the Board of Trade.

A Deputation from a large number of Local Authorities recently attended at the offices of the Board of Trade, with reference to the new Model Provisional Order under the Electric Lighting Acts, lately issued by the Board. Our readers are probably aware that, in this form of Order, provision is made for the transfer of electric lighting powers from local authorities to companies; and although this concession was regarded with satisfaction, there are certain clauses which did not meet the approval of the authorities. Their objections were formulated at a meeting at the Westminster Palace Hotel, and discussed *seriatim* at the Conference, at which Mr. Calcraft, Mr. Courtenay Boyle, and Mr. Gray, representing the Board of Trade, were present.

The first objection brought forward was in respect of clause 6, by which the supply of electric light beyond a certain area is prohibited. It was pointed out this clause was an entirely new one; and it meant that if the undertakers of any system of electric lighting were to go outside their district, the Order they had obtained might be revoked. It was considered that such a provision was entirely unnecessary, because if the undertakers exceeded their powers, they would be *ultra vires*, and could be dealt with at common law. The clause was one which was not quite fair, though it could be made an advantage rather than a disadvantage by being amended so as to give the Board of Trade power to authorize the laying down of mains in adjoining districts. Mr. Calcraft said he thought the Board of Trade would agree to this, as well as to the substitution of ten for five acres in the clause relating to the purchase and use of land for electric lighting purposes.

With regard to the power to execute works, the second paragraph of clause 9, specifying that undertakers of electric lighting works are not to break up any streets or roads, or any railway or tramway, except such parts as may be scheduled in the Order, not repairable by them, without the consent of the authority or company by whom such streets or roads, rails, or tram lines are repairable—was objected to. It was pointed out that section 13 of the principal Act authorized, or purported to authorize, the Board of Trade to consent to the breaking up of private streets, railways, and tramways; and if this paragraph, which prevented electric lighting mains from being laid in private streets, were to stand, an important power would be taken away. Many corporations had relied upon the general power of the Board of Trade, and had not scheduled any private streets. A second point raised was the refusal of power to lay down mains in roadways crossing railways, &c. Mr. Calcraft said they would meet the objection as to private streets by amending the clause; but nothing could be done on the second point, which could be met, it was thought, under the Gas-Works Clauses Act.

A suggestion was then brought forward as to the amendment of clause 12, having reference to compensation in the case of streets not repairable by the local authority, by omitting in sub-clause (*a*) the words, "and stating the amount of compensation, if any, proposed to be made in respect therefor and the manner in which such compensation is proposed to be paid or secured," and by inserting in sub-clause (*c*) "and the amount of compensation payable to the owners." This was accepted. It was also intimated that the clause requiring local authorities to give security would be omitted; and that clause 18, giving power to the Board to revoke an Order because of a defect in the construction of works, would not be gone on with, as other clauses which would meet this contingency would be inserted.

The Town Clerk of Nottingham (Mr. Johnson) next offered an objection to the provision limiting to two years the time for the completion of the works. He said he represented a Corporation who owned the gas-works in the town; and though they had no intention of acting in a "dog in the manger" spirit, such a provision would, he said, prevent many local authorities from going on with the supply of electricity at all, as it would require almost all the time specified to complete the central stations, without touching on places outside their area. Then he objected to the clause which compelled the undertakers to lay down mains when guaranteed 20 per cent. upon the cost of the mains by six persons or more. He pointed out that it might be necessary to lay out a station to supply these persons. What they asked was that they should be allowed to lay down their conditions in each case, with power for those concerned to refer to the Board of Trade if they were dissatisfied. Mr. Calcraft said the clause would have to stand, but with a proviso that there would be an appeal to the Board of Trade, which would also cover the question of time.

A discussion then arose as to the appointment of inspectors—Mr. Johnson and others of the deputation strongly objecting to the power of appointment remaining with a court of summary jurisdiction—and it was arranged that the Board of Trade should make the appointments. Alterations were agreed to in several minor matters to which objections were taken, and the conference closed.

Electric Lighting Companies and the Powers of Local Authorities.

Last Friday, Sir Michael Hicks-Beach received a Deputation of Electric Lighting Companies, who complained of the clause proposed to be inserted in many of the Provisional Orders of the present session, enabling local authorities to transfer their powers of electric lighting. Sir John Puleston, M.P., introduced the deputation. Mr. Fletcher Moulton, Q.C., contended that the proposal of the local authorities in question was an injustice both to the electric lighting companies and to the public. Under the present procedure, a transfer of powers *en bloc* had to be made the subject of a special application to the Board of Trade for a Provisional Order, which must, if granted, be confirmed by Parliament. The public thus had the protection of a departmental and parliamentary examination. Such a clause as was proposed would enable the local authorities to play a "dog in the manger" part, and would enable them to dictate any terms to a company wishing to supply. The Electric Lighting Act distinctly contemplated that the local authority should intend to distribute within a reasonable time; but in some cases as long as seven years had elapsed without any steps being taken by the authorities, and without interference by the Board of Trade to compel them to exercise their powers. Sir M. Hicks-Beach, in reply, observed that the municipal authority was the representative of the people; and it was not for the Board of Trade to protect a town against its own corporate body. He could assure the deputation that any proposed transfer under such a clause as was to be inserted in the Order would receive the same careful consideration as did an application for an independent Order under the present system.

STALYBRIDGE CORPORATION GAS SUPPLY.

The Manager's Annual Report.

The Manager of the Stalybridge Corporation Gas-Works (Mr. E. A. Loam) presented his annual report to the Gas Committee at their meeting on Tuesday last. It dealt with the twelve months ending March 25 last; and gave the following particulars.

The amount of coal and cannel carbonized for the year was 11,930 tons; and the make of gas per ton was 10,604 cubic feet, against 10,222 cubic feet in the previous year, or an increase of 382 cubic feet per ton. The quantity of gas made was 126,517,500 cubic feet, against 123,096,800 feet, or an increase of 3,420,700 feet, with a decrease in the carbonizing of 111 tons. The quantity of gas sent out was 126,447,900 cubic feet, as compared with 123,161,400 feet last year, or an increase of 3,286,500 feet. The quantity of gas sold per ton of coal carbonized was 9089 cubic feet, against 3821 feet last year, or an increase of 268 feet. The cost of the coals, after deducting the sum received for residuals, amounted to £4220; and the working expenses for the manufacture, distribution, &c., to £5286. This made the total cost £9506, against £9461 (or an increase of £44), equal to 15s. 11·08d. per ton, against 15s. 8·58d. in the preceding year. Owing to the large increase in the price of coal this year, it had cost £808 more than last season. As to the maximum consumption of gas in the months of November, December, and January, Mr. Loam found the days and figures to be as follows:—Nov. 11, 798,000 cubic feet; Nov. 29, 863,200 feet; Dec. 6, 841,800 feet; Dec. 20, 769,600 feet; Dec. 24, 812,000 feet; Jan. 10, 728,000 feet. The largest daily make during the winter was 863,200 feet; and to produce this quantity, 150 retorts were employed—showing a make of 5754 feet per mouthpiece. The total storeage of the gasholders was equal to about 840,000 feet, or 23,200 feet under the largest daily consumption. These figures Mr. Loam thought indicated the absolute necessity for providing additional gasholder capacity; and he recommended the Committee to shortly prepare for future extensions. In a manufacturing town like Stalybridge, where the consumption of gas was very irregular in foggy weather, and taxed the resources of the Gas Manager, the storeage capacity, he held, should be at least double the largest daily make. Referring to the engine-house, the report stated that there was only one engine and one exhauster and two small boilers. There ought, he contended, to be duplicates, because if a breakdown should occur (and such things usually happened in midwinter, when the strain was greatest), the production of gas would be seriously impeded, and the whole process of manufacture must be disorganized. The new purifying machine erected by Messrs. C. and W. Walker, he mentioned, had been at work since October last; and he was pleased to state that it had given great satisfaction. It was a most efficient machine for purifying the gas from ammonia. A great deal of sulphuretted hydrogen and carbonic acid was also removed from the gas by these machines—thus saving much work on the purifiers. Regarding the electric light, in Mr. Loam's opinion, it is the most formidable rival gas has; but he does not think that gas will ever be superseded. Appended to the report are tables, giving an analysis of the revenue account, and an abstract of the year's working statements. From the latter it is seen that 126,447,900 cubic feet of gas were distributed. Of this, 6,749,000 feet was used for public lighting, 46,960,200 feet was supplied to large consumers, and 54,741,000 feet to small consumers. These make a total of 108,450,200 feet, and the balance, 17,997,700 feet, or 14·23 per cent. on the deliveries, was unaccounted for. Altogether, 11,930 tons of coal and cannel were carbonized. The proportions in which these were employed were 49·32 per cent. of screened coal, 24·55 of unscreened coal nuts, 16·81 of hand-picked cannel, and 6·52 of cannel nuts. The gas made per ton of coal averaged 10,604 feet; and the quantity sold was 9087 feet per ton. The illuminating power averaged 19·33 candles. The gas-rental amounted to £14,927. The gross profit was £5453; and the net profit, £1222.

Report of a Special Commissioner on Lead-Poisoning at Sheffield.—Lead-poisoning has been so extensively epidemic of late in Sheffield and the places immediately surrounding it, that the *British Medical Journal* has sent a Special Commissioner to examine and report on the facts. From information furnished by a report from the local Medical Society and a Special Committee, it appears that during the last two or three years more than 1000 well-marked cases of lead-poisoning have occurred in the district, and a house-to-house visitation in one of the streets of Sheffield showed that every person examined, almost without exception, had the blue line on the gums characteristic of lead-poisoning. It is alleged, indeed, that this indication of the saturation of the system with lead could be found on the gums of nearly one-third of the population of Sheffield. In severer cases there were found the drop wrist, paralysis, epilepsy, rheumatism, and other of the characteristic symptoms of the more intense forms of lead-poisoning. The influence on child-bearing women was most disastrous; the number of miscarriages being extraordinarily great. One patient had six miscarriages in succession, after which, under treatment for lead-poisoning, and using only filtered water, she has had two healthy children. The lead-poisoning has been traced to one particular source of water supply—that furnished by the high-level reservoir. A further report will examine the cause of this serious condition, and the best means of obviating it, with a criticism on those methods which are at present adopted by the local authorities, who are fully alive to the gravity of the situation, and who have consulted some of the most eminent chemical professors and sanitarians.

WARRINGTON IMPROVEMENT AND WATER-WORKS BILL.

As briefly mentioned last week, a Meeting of the Warrington Town Council was held on Wednesday, the 23rd ult.—the MAYOR (Mr. Alderman Francomb) presiding—to pass a resolution formally authorizing the promotion of the Improvement and Extension Bill, which contains, amongst other matters, clauses relating to the purchase of the water-works. The resolution having been duly proposed and seconded,

Alderman CROSFIELD remarked that he declined to take any responsibility at all in the matter, because he could not approve of the purchase of the water-works. If the ratepayers were satisfied to give £100,000 more than the undertaking was worth, it was their look-out; but he thought it a very serious thing to do. It was a risky thing to buy water-works when they might awake some morning and find that the water had "bolted." He thought it a dangerous and foolish bargain which it was proposed to enter into.

Alderman HARRISON observed that Alderman Crosfield's objection to the purchase of the water-works appeared to be simply a question of money. He seemed to think they were about to give £100,000 more than the property was worth. He was sorry to find that Mr. Crosfield seemed inclined to be "a croaker." He appeared to think that the water might some fine morning disappear. It was quite possible that might be so; and it would be a very disagreeable circumstance. But he did not think there was any probability of anything of the kind occurring. Before the bargain was concluded, they would take precautions, and have a reasonable belief that the water would not adopt the eccentric course suggested by Alderman Crosfield, and go to some other quarter. They would have to be fully satisfied on that point before the purchase was concluded.

Mr. MONKS said the view he held was that the Council had not had the preliminary examinations which were necessary before coming to terms. Very much would depend upon the report of the experts to be called in, as to whether it was desirable to confirm what he would call the "unofficial offer" which had been made by the Corporation. It appeared to him to be an unbusiness-like proceeding on the part of the members of the Council to commit themselves to a Bill like the present for what might be, after all, a problematical purchase. There was nothing to prevent the Corporation, after the bargain had been made, and all the terms had been settled, obtaining powers to purchase by a Provisional Order or by a short Act of Parliament, and that was, he contended, the right and proper course to take.

Mr. VOISEY observed that many members of the Council founded their opposition to the Bill mainly on the clauses relating to the purchase of the water-works; but, seeing that these clauses did not commit the Council to the purchase, this objection should fall to the ground. The Council would have ample time before the six months had elapsed to re-consider, if necessary, the question of whether it was a fit and proper purchase on the basis which had been already submitted. They were, in a measure, bound by the ratepayers to promote the Bill.

Alderman HARRISON said that whatever the Council did that evening would not pledge them at all. They could let the whole thing drop within six months of the Act being obtained.

The resolution was carried by 25 votes to 2; the dissentients being Alderman Crosfield and Mr. Monk.

ODESSA WATER-WORKS COMPANY, LIMITED.

The Ordinary General Meeting of this Company was held last Wednesday at the Cannon Street Hotel, E.C.—Sir PETER SPOKES in the chair.

The SECRETARY (Mr. W. D. M. Forrest) read the notice convening the meeting; and it was agreed to take as read the Directors' report for the year ending Dec. 31 last. This indicated that the water-rents for the twelve months amounted to £53,092, against £47,620 for the previous year, and the miscellaneous receipts to £3570, as compared with £3530. The continued improvement in the value of the rouble in 1889, showed that the loss by exchange for 1888 of £853 had been converted into a profit of £576 for 1889; and the net revenue, after meeting interest on debentures and all charges, including drawn bonds, stood at £10,211, against £8845 for 1888.

The CHAIRMAN, in moving the adoption of the report, remarked that, while it was not in all respects so satisfactory as the Directors could wish, yet he thought it might be regarded as more favourable than any which had preceded it. For instance, although it was disappointing that the negotiations with the Municipality of Odessa for bringing about more cordial relations had broken down, yet the past year showed the largest amount of revenue that the Company had ever had—a 10 per cent. increase on 1888. Notwithstanding that the great outlay for the renewal of the boilers at the Dniester station had been charged against the revenue of the year, the net balance on revenue account was about £1400 better than in the previous year; and although the proposed dividend of 4s. upon the preferred shares fell very far short of that which was expected upon the formation of the concern, still it would be paid out of the income of the year, even admitting the possibility of the Court of Justice deciding in the case now pending that the difference between 7 copecks and 6 copecks for the domestic supply should be refunded to those consumers who had paid upon the higher rate. *Per contra* it was very disappointing to find that the Imperial Government of Russia should so persistently resist their demands for payment for the water supplied to the garrison—still more so, seeing that two decisions had been given against them—and they had decided to carry the matter to the Final Court of Appeal. This was a very important question for the Company, as the accounts for this garrison supply now amounted to close upon £10,000 of the outstanding water-rents. With reference to the Hill station, the new pumping machinery and buildings had been completed; but at the suggestion of the contractors, some alterations to the pumps were being made, with a view to securing a further increase in the supply of water. Looking at the accounts, it would be observed that there was a net increase from water-rents and miscellaneous receipts of more than £5500, no less than £5300 of which was due to household consumption. Baths exhibited an improvement of nearly £190; gardens, more than £600; factories, £200; and the garrison, approaching £500. On the other hand, there was a large increase in expenditure, owing principally to the renewal of the Dniester boilers, which accounted for almost £4000 of the increase. Taken altogether, the net balance of revenue was £1370 better than for 1888.

Sir ARTHUR CLAY, Bart., seconded the motion.

A long discussion ensued, in the course of which the management of the concern was severely criticized.

The report was ultimately adopted; a dividend of 4s. per share on the preferred shares was declared; and the retiring Directors (Sir Arthur Clay and Mr. G. May) were re-elected.

THE RICHMOND (SURREY) MAIN DRAINAGE WORKS.

The works which have been designed by Mr. J. C. Mellish, C.E., for the treatment of the sewage of Richmond and the surrounding districts of Petersham, Kew, Mortlake, and Barnes, were recently visited by a party of the students of the Institution of Civil Engineers. The area covered has now a population of about 35,000; but this figure is rapidly increasing, and it is probable that the sewage from a population of about 70,000 will finally have to be dealt with. All the sewage of the district now flows direct into the river; and therefore the principal feature of the new works is a line of intercepting sewers, which, running for the most part along the river bank, collects the discharge from all the old outlets, and brings the whole to a point near Kew Gardens, where works for treating the sewage by the sulphate of alumina process are being erected. As far as possible, storm water will be excluded from this sewer, and passed straight into the river, though the separate system cannot be adopted in its entirety, or it would be necessary to relay many of the existing sewers. In all, the new sewers will have a length of upwards of five miles. At its commencement, near the Richmond boundary, the sewer is a pipe 16 inches in diameter, and laid about 18 feet deep; whilst at the site of the works the diameter has increased to 4 feet, and the sewer is 43 feet below ground level. Throughout nearly its whole length, the sewer has been laid in the London clay, which is met with at about 15 feet below the ground level; the overlying beds being water-bearing sands and gravels. The sewer has therefore been laid principally by tunnelling, though at one or two spots the roof of the heading has fallen in, and it has been necessary to resort to open cutting—powerful pumps being then required to keep the workings clear. The precipitation works have been laid out on an 11-acre plot of ground; but only about one-third of it is actually occupied by them. The sewage will be let into a large pump-chamber below the engine, carried down into the London clay, and lined with concrete. In this chamber a small quantity of unslaked lime will be added, so as to render the sewage slightly alkaline; and it will then be pumped into a conduit leading to the mixing chamber, where sulphate of alumina and a little carbon will be thoroughly mixed with it by means of agitators. The proportions to be used are 276 grains of sulphate of alumina and 158 grains of unslaked lime per head of the population per day. The carbon is added as it decidedly improves the effluent. From the mixing-house the sewage passes into a set of eleven precipitating-tanks, capable of containing about 1,200,000 gallons, where the effluent is quietly drawn off from the top, and the sludge settles to the bottom, whence it flows by gravitation into a pump-chamber beneath the press-house, where a complete pressing-plant is to be set up. The unpressed sludge contains 90 per cent. of water, 40 per cent. of which is removed in the presses. The resulting cake has then about the consistency of ordinary manure, and is intrinsically worth about 10s. a load, though this sum can seldom be obtained for it. The effluent has afterwards to be passed on to a set of filter-beds covering about 1½ acres. In addition to the sand and gravel, these beds will have a layer of carbon, to still further purify the effluent. Altogether, the works are expected to cost £75,000, of which upwards of £40,000 will be absorbed in making the new sewers.

The Gas Question at Formby.—For a considerable time past, the question of lighting the principal thoroughfares in the township of Formby with gas has been very freely discussed; but owing to the strong opposition put forward by many of the oldest inhabitants, who have done without gas all their lifetime, and who are afraid of the rates being largely increased, the proposal has never met with much support. At the annual township meeting a few weeks ago, a resolution was carried to the effect that it is not advisable to light the township with gas. A poll was demanded, which took place last week, and resulted in a majority of 117 against the adoption of gas.

New Water Supply Scheme for Malton and Norton.—Messrs. Fairbank and Son, Engineers, of Westminster, have prepared, at the request of the Malton and Norton Local Authorities, alternate schemes for the supply of water to their districts. One scheme, by which it is proposed to pump water from what are known as the Spring Cottage springs, would only suffice for Norton; and the estimated cost is £3300. By the alternative project, it is suggested to obtain water by gravitation from Settrington; and this would give a supply for the two places of 398,000 gallons daily. The cost of this scheme is computed at £9400. The authorities have not arrived at any decision on the matter.

The Incorporation of Richmond (Surrey).—The charter and scheme for the incorporation of Richmond (Surrey) are now in the hands of the Law Officers of the Crown, for final revision prior to their settlement by the Committee of Council. This revision is merely a formal matter; and it is anticipated that it will be completed, and the scheme finally settled, at a very early date. It will then be published in the *London Gazette*, after which there must be an interval of one month, during which any local authority affected by it, or not less than one-twentieth of the owners and ratepayers in the parish, may petition against it. No opposition, however, is anticipated; so that the scheme will in all probability be at once confirmed by Order in Council, and be received in Richmond about the end of June.

NOTES FROM SCOTLAND.

From our Edinburgh Correspondent.

EDINBURGH, *Saturday.*

The Edinburgh International Exhibition was opened by the Duke of Edinburgh on Thursday last; and closer acquaintance with it but confirms the anticipations regarding it which I expressed in last week's Notes. As a show, it is without doubt the finest which has been seen in Scotland; but as an exhibition of electrical appliances, it is nowhere. An exhibitor stated to me yesterday that the best of the London electricians had not come to it; and that, so far as he was concerned himself, he had not brought his best stuff. I am afraid he was but stating an excuse for the industry; but however that may be, it is a fact that, if you exclude the plant necessary for generating the electric light, the whole of the electrical exhibits would go into a corner. There are few exhibits of gas appliances—so far as I have seen, there are none illustrating gas lighting—but all the same gas is in evidence all over the place. Gas is kept lighted in all the corridors; and on the covered bridge at the main entrance, it is the only light in use.

The Edinburgh and Leith Gas Commissioners held their monthly meeting on Monday, at which Mr. Wells raised the question of the coal contracts, to which I referred a fortnight ago. As a preliminary canter, however, complaint was made that the question of reducing the quality of the gas should have appeared in the newspapers. It was said that the discussion on the subject was only an informal one, and that it was very injudicious for any member of the Works Committee to have given information about it. An attempt was also made to give a denial to the statement, by pointing out that it could have no foundation seeing it was not in the minutes of the Committee meeting. It is the case, however, that the Committee resolved upon a reduction in the quality of the gas. How it did not appear in their minutes is for themselves to find out. Perhaps it is only another method they have adopted of keeping the community in the dark as to their doings. Mr. Wells's complaint was based on the schedule of stores estimated for, which were: For the Edinburgh works, 83,000 tons of coal, at a total price of £67,125, and an average price of 16s. 0·99d. per ton; 5000 tons of lime, at a total cost of £2747 18s. 4d., and an average price of 10s. 0·99d. per ton. For the Leith works, 41,000 tons of coal, at a total cost of £33,177 1s. 8d., and an average price of 16s. 2½d. per ton; and 2200 tons of lime, at a total cost of £1257 5s., and an average price of 11s. 4½d. per ton. He complained that the question of whether the above should be agreed to was not put to the vote in Committee; and that when he proposed a motion, he was ruled out of order. He went on to say that coal contracts were left to the Engineers. There was not a gentleman there, he believed, who had yet seen the original tenders. They had 43 orders given to 36 companies—26 for Edinburgh, and 17 for Leith. Only four of the offerers were accepted for both works. How was it that the other 22 were not considered good enough for Leith, or the other 13 for Edinburgh? If coal was good for the one works, it was good for the other. It looked to him as if this were just a beautiful distribution of favours; and he believed that if they limited their contractors to one-half, the competition would be greater. It was unfair to the coalmasters, to the Engineers, and to themselves, that they should throw the responsibility upon the Engineers. He proposed that they should appoint a small Committee to open tenders and to make a thorough calculation, and report to the Committee. The business was not one which could be settled in an hour and a half. They spent £100,000 at an hour-and-a-half's sitting. That was too much. No gentleman there could point out the reason why any particular coal was accepted. So far as Edinburgh was concerned, at all events, there was no basis for the acceptances at all. So far as they knew, no reference had been made to the analyses given by the coalmasters; and they did not know that in the Edinburgh works there was any provision at all for making analyses. In the Leith works, the Engineer made the analyses. Mr. Colston said Mr. Wells was not in order in raising the question he had done upon the minutes. At the Committee meeting, when they saw the number of tenders, they thought it right, as had hitherto been done, to remit them to the Engineers. For the Edinburgh works there were 80 tenders for coal, 12 for lime, and 93 for general stores—in all, 185; for the Leith works, there were 63 tenders for coal, 6 for lime, and 69 for general stores—138 in all, or for both works 323 tenders. He asked if it was reasonable that members of the Board should be subjected to the trouble of going over all these tenders to satisfy themselves about them. There must always be some trust put in those who were responsible to them for the carrying on of their work, and therefore the Committee in its wisdom thought it proper that a remit should be made to the Engineers. He would be a bold man who would quarrel with the Engineers, and say that a certain coal should or should not be used. After some conversation the subject dropped, on the understanding that Mr. Wells would renew it before next year's contracts are entered into. Of the other business before the meeting, the Engineers' reports showed that the output of gas from the Edinburgh works during March was 77,969,000 cubic feet, a decrease of 164,000 cubic feet, as compared with March of last year. From the Leith works the output was 38,978,000 cubic feet, an increase of 3,416,000 cubic feet. The amount collected for gas for the quarter ending March 15 was £76,610 19s. 8d., an increase of £1452 17s. 9d. over the corresponding quarter of the past year, and making an increase for the ten months of the present year of £6730 12s. 8d. It was reported that the price of coke had been raised to 10s. per ton, and that other residuals had risen, in accordance with the sliding scale, from 2s. 5d. to 3s. 1d.

A "History of Water Supply in Edinburgh" has just been completed by Mr. Councillor Colston, who undertook the work at the request of the Water Trustees. Mr. Colston is more familiar with the arrangements for water supply in this district than any man living; and consequently it was most fitting that he should prepare the record which the Trustees were desirous of having. Only a few hundred copies of the work are thrown off, so that it is almost a private publication. It is well written and printed, handsomely bound and illustrated; and anyone fortunate enough to secure a copy, will become possessed of a work which it will be a pleasure both to look at and to peruse.

From our Glasgow Correspondent.

GLASGOW, *Saturday.*

In connection with the local Gas and Electricity Bills an important question of *locus standi* came up before the Court of Referees of the House of Commons on Thursday—Mr. C. S. Parker presiding. The promoters of the Partick, Hillhead, and Maryhill Gas and Electricity Company Bill contested the *locus*, as petitioners against the Bill, of certain persons signing the petition of ratepayers, &c., in Kelvinside and others. Mr. Pembroke Stephens, Q.C., who appeared for the petitioners, stated that they were gas consumers, who were now supplied by the Partick, Hillhead, and Maryhill Gas Company. They were not a public representative body, but a Committee representing a public meeting which passed a resolution in opposition to the Bill. After discussion, *locus* was allowed. The promoters of the Glasgow Corporation Bill contested the *locus* of the Partick, Hillhead, and Maryhill Gas Company, Limited, and Mr. Rickards stated the case for the Company. He pointed out that at present the body whom he represented had powers to supply gas within a certain limited area, and that by the Bill which they had submitted to Parliament, they asked sanction to supply electricity or electrical energy and gas within their existing area of supply. Their proposals somewhat interlaced with proposals put forward by the Corporation of Glasgow, who had statutory powers to furnish with gas the area which they (the Company) supplied, and they desired to have the option of appearing against those proposals of the Corporation. He argued that, in the peculiar circumstances of the moment, they ought to have that option. The Corporation Bill proposed to give authority to supply electricity within the City and Royal Burgh of Glasgow. But the city authorities were promoting this session the Glasgow Boundaries Bill. If that Bill passed, the Royal Burgh of Glasgow would be extended; and the area as reserved by the Company which he represented would consequently be included within it. In that case the Glasgow Gas Commissioners would become competitors with the Partick, Hillhead, and Maryhill Company for the supply of electricity within the Company's district; and the Company wanted to guard themselves against such a result. Mr. Pollock, in replying for the Corporation, said that the Company in question had no possible right to be heard against the Corporation Bill. It did not affect them in the least; nor did it affect their district or area of supply. So far as the Bill was concerned, its provisions were framed to meet the case of the City and Royal Burgh of Glasgow only. The Company were petitioners against the Boundaries Bill on the question of the supply of electricity. They had opportunity to be heard against that Bill in the House of Lords; and if it passed their lordships, they would have opportunity to appear again in the House of Commons. If they got *locus* in this case—in the case of a Bill with which they had nothing to do, while they had to do with another Bill against which they already had *locus*—they would be put in possession of four shots against the Corporation. After consultation in private, the Court decided to allow the Company *locus standi*.

The Glasgow Boundaries Extension Bill was unanimously rejected by the House of Lords Committee yesterday, to the great surprise even of many persons who were decidedly opposed to it, and to the disappointment of its promoters and many thousands of Glasgow citizens who were anxious to become citizens of a "Greater Glasgow." There is a widespread feeling that the promoters were too grasping, and that they should for the present have contented themselves with a scheme of extension which did not aim at annexing the burghs of Partick and Govan without their consent. What the Glasgow Town Clerk and his Parliamentary Committee and their colleagues in the Town Council will now do, it is impossible to say; but that they have met with a very serious rebuff, as on sundry former occasions, goes without saying. On Thursday, in the course of a very able address to their lordships by Mr. Littler, on behalf of the Partick authorities, that gentleman remarked that, with regard to water, the Corporation of Glasgow had not treated the people of the burgh as if they were part of the community. They laid a special water-rate upon them. They were now paying 4d. in the pound more than if they were inside Glasgow; but still they would rather pay than go inside. Therefore Glasgow would lose rather than gain by their going in, because it would lose the special rate. A special gas and water rate was put upon Partick and the other burghs in 1870, in order to punish them for having the great temerity to throw out the great Annexation Bill to which he had formerly referred. Owing to the exaction of Glasgow, they had to establish gas-works of their own, so that they were nearly independent of Glasgow in that respect, and they hoped to be more so. On being asked by the Chairman (Lord Romilly) if he would not now address himself to the Gas Company, Mr. Littler submitted that if the Glasgow Corporation became the controlling authority in the district the Gas Company must cease to exist. (Mr. Pope, Q.C.: Why?) Because the Glasgow Corporation would light the public streets and common stairs, and by that means take from the Company something like 43 per cent. of their rents. Counsel explained that he intended to call a few witnesses to bear out what he had stated. Later in the day, Mr. Moulton, Q.C., said he proposed to examine a few witnesses on behalf of the Partick, Hillhead, and Maryhill Gas Company. Mr. Graham Murray, of the Scotch bar (the leading Counsel for the Glasgow Corporation before the local Boundary Commissioners), at once interposed, and called the attention of the Chairman to the statement which he had previously made, to the effect that if the Committee otherwise approved of the Bill they would not throw it out in consequence of the opposition of the Gas Company. He also stated that his object in doing so was to point out that in the case of anything which came out of the evidence of the witnesses about to be examined by his learned friend which had not already been met by the promoters, it might be necessary to call at least one gas witness to rebut it. This suggestion having been approved of by the Chairman, Mr. Moulton called Mr. James Muirhead, member of the firm of Messrs. Guthrie, Smith, Muirhead, and Co., Glasgow, solicitors to the Gas Company. He deposed that the gas made by the Company for the year ending June 30, 1889, amounted to 283 million cubic feet; and that the consumption was within 10 per cent. of that amount. According to the statement placed before the

Boundaries Commissioners, the supply of gas in the year 1887 to the three districts by the Glasgow Corporation amounted to 57,000,000 cubic feet, so that the Gas Company supplied five-sixths of the amount of gas that was consumed in their area of supply. There had not been, to his knowledge, any complaints in regard to the supply of gas by the Company, which was a satisfactory one. Theirs was not only the fifth largest Gas Company in Scotland, but it was the fifth largest gas undertaking. The price charged was the same as that in Glasgow; and in addition they supplied the service pipes from the mains up to the meters free of cost, while he understood that in Glasgow the Corporation charged the consumers for them. The public and stair lighting in the district was almost exclusively done by the Company, which was formed in the year 1871. Previous to that time the burgh of Maryhill had been supplied since 1845 by a limited liability company; and the other two burghs were supplied by two companies which were ultimately bought up by the Glasgow Corporation. After the annexation fight in 1870, Glasgow put on a differential gas-rate for the outside districts. That excited a very strong feeling in the districts; and the result was that a number of influential men in the three burghs formed a gas company, and the burghs in question supplied three-fourths of the required capital. In the Provisional Committee there were embraced, he understood, the whole of the magistrates of the three burghs. Some progress having been made with the works, the differential rate was withdrawn by the Glasgow Corporation, who would not, however, give any guarantee that the objectionable rate would not again be imposed. From what the witness knew of the Company, the gas supplied was both cheap and efficient. Supposing the Bill were passed, with clauses sufficient for the protection of the Company, their position would be seriously affected, as the Corporation must then certainly take the stair-lighting into their own hands. At this stage, the Chairman repeated his opinion that the matter was now entirely one of clauses; for if the Bill passed, the Company must be protected. The continuation of this evidence, together with the cross-examination that might arise out of it, was then reserved for the clauses, in case the preamble of the Bill should be passed. After sundry remarks between the Chairman and Mr. Moulton and Mr. Murray, the sitting closed, on the understanding that Mr. Pope should address the Committee next morning. In due course, Mr. Pope delivered his speech on behalf of the promoters of the Bill; and when he had concluded, the Committee-room was at once cleared. At the expiration of about five minutes, the doors were re-opened; and Lord Romilly announced the result of the Committee's deliberation, which I have previously mentioned. It is stated by a London correspondent that the Glasgow Corporation had been pressed by the Partick, Hillhead, and Maryhill Gas Company to purchase their undertaking for the sum of £220,000, but refused to do anything beyond giving clauses to secure the Company in their existing rights.

The next fight will arise over the Gas and Electricity Bill which is being promoted by the Partick, Hillhead, and Maryhill Gas Company, whose title is to be extended. It may not last so long as the fight that has just terminated; but there is every prospect of it being bitter while it does. It is stated that it is to be called on Monday, May 12.

There has been much more strength in the Glasgow pig iron market this week, and the price of Scotch warrants has advanced from 44s. cash per ton, which was paid on Monday, to 46s. 5d., which was paid yesterday afternoon. The close, however, was a shade easier. Cleveland and hematite warrants have also improved in price during the week. For the last week or ten days there has been a lot of quiet buying on the part of speculators, who thought that at anything below 45s. per ton, Scotch pig iron was safe to hold. A large number of additional orders from consumers, especially on the Continent, are being brought out. The withdrawals from store are still very large. During the five days ending last night, 9511 tons of Scotch pig iron were withdrawn. There are now 87 blast furnaces in actual operation, as compared with 76 in the corresponding week of last year.

Business in the Glasgow coal trade has quieted down very much this week, and prices are in most cases declining. For steam coal there is an improving demand, and the quotations are firm.

The Lancashire Coal Trade.—The demand for the commoner descriptions of coal for iron-making purposes has shown a distinct falling off during the week just closed, and household coal drags on the market. The better qualities of round-coal are very plentiful; and a very fair business in this line is reported. Steam fuel has also moved off freely; and the demand is well maintained, except for shipment. Many collieries are stacking household coal, owing to the lessening demand with the approach of summer; but, generally speaking, the market has been steady, and a fair amount of business done. Burgy averages 8s. to 8s. 6d.; best slack from 7s. 6d. to 8s.; and common fuel is obtainable at 6s. to 7s. at the collieries. Steam coal for delivery at Liverpool is quoted from 10s. 6d. to 10s. 9d. per ton, ordinary qualities; and best house coal at the pit-mouth fetches something like 12s. per ton; seconds, 10s.; and common, 9s. to 9s. 6d.

Northern Coal Trade.—The export demand for coal has risen considerably; the Baltic demand for the season having now set fully in, both for steam and gas coal. Best Northumbrian steam coals are quoted at 12s. 9d. to 13s. per ton free on board, and most of the collieries are now well supplied with orders; but the production is larger than it was. For gas coals the demand is large for export; but the local Gas Companies are taking comparatively small quantities. The best gas coal collieries are still working fully; and in some instances are making up for short supplies in contracts. Other gas coal collieries, however, are not at present well supplied with orders. The price of best Durham gas coal may be put from 13s. to 13s. 6d. Bunker coals are easy; and the large quantity of coking coal which is being thrown on the market, must affect the price of some kinds of coal soon. Household coals are depressed, and have this month been slightly reduced in price. For manufacturing coals, there is a good demand. Coke is lower in price for blast-furnace purposes—varying from 22s. to 23s. per ton free on board in the Tyne. Gas coke maintains its steadiness; the supply now being naturally more limited.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *May* 3.

Sulphate of Ammonia.—The market has assumed a very quiet tone. The continued scarcity of orders has been taken full advantage of by those interested in so doing, to lower the prices. It cannot be said that the season has been altogether favourable to the use of sulphate; and this will probably account, in a great measure, for the home demand not having come up to the average of previous seasons. The transactions at Hull have been at £11 5s. to £11 2s. 6d.; and at the latter figure, sellers seem to be firm. With the exception of one or two small contracts for Scotch makes, which have been sold at about £11 5s. f.o.b. Leith for some months forward, nothing has been done in "futures;" and there is but little inclination on the part of makers to anticipate their production at these reduced rates. Prompt Leith is quoted from £11 2s. 6d. to £11 3s. 9d.; and f.o.b. Liverpool, £11 2s. 6d. to £11 5s. The deliveries of nitrate for consumption having continued throughout on an extensive scale (about 150,000 tons more than at this date last year), the statistical position is certainly satisfactory. The firmer tendency is maintained; and if the much-talked-of arrangement among producers was to become a *fait accompli*, values would certainly advance. Quotations on spot remain at 8s. 1½d. to 8s. 3d.

LONDON, *May* 3.

Tar Products.—Quietness still prevails in this market, and very little new business is reported. Most distillers are, however, well sold; and a substantial business is going on with old contracts. Stocks at works are low, and in the case of pitch, perhaps never so low as they are now. There is a little better feeling as regards pitch; and it is expected that the fall of the year will find this article in even better request. Carbolic acid is still weak, and unsaleable. Benzol, on the other hand, is enquired for, and quoted 1d. higher. The following prices have been paid during the week:—Tar, 25s. to 30s. per ton according to position. Pitch, 27s. to 29s. per ton. Benzol, 90 per cent., 3s. 8d. per gallon; 50 per cent., 2s. 7½d. Toluol, 1s. 10½d. per gallon. Solvent naphtha, 1s. 9d. per gallon. Crude naphtha, 1s. 3d. per gallon. Light oil, 4d. per gallon. Lucigen oil, 2¾d. per gallon. Ordinary creosote, 2½d. per gallon. Carbolic acid, 2s. per gallon. Anthracene, (30 per cent.), "A" quality, 1s. 3d. per unit, "B" quality, 1s.

Sulphate of Ammonia.—No new business of any importance has been reported. Large shipments, however, are going on (on old contracts), and with the usual difficulties in cases where buyers have paid more than the present rates. Few makers are pressing sales; but the regular enquiry which occurs at this time of the year, is conspicuous by its absence. Speculators, however, are willing to contract for the remainder of the year at a shade better price than is now quoted—viz., £11 2s. 6d. to £11 5s., less 3½ per cent., according to position and delivery. Gas liquor is marked from 6s. to 8s., with no new business doing.

Sale of Shares.—A few days since, 20 original £10 shares in the *Beccles Gas Company* (on which during the past three years 9 per cent. has been paid) realized at a public auction £15 10s. per share; and eight shares of the 1883 issue produced £14 15s.

The Price of Gas at Lytham.—At the meeting of the Lytham Improvement Commissioners last Thursday, it was intimated that a reduction of 3d. per 1000 cubic feet in the price of gas was in contemplation. The profit last year was £1100.

A Year's Working at the Colne Gas and Water Works.—At the meeting of the Colne Local Board last Tuesday, the annual statements of the Gas and Water Departments were presented. The gas account showed a balance of £429 1s. 3d., which is an increase upon previous years. The amount paid for wages had been less than formerly; and more gas had been made. The water accounts gave the expenditure as £3097 14s. 10d., showing a favourable balance of £830 5s. 1d. The new reservoir had cost £43,962. The present supply equalled 380,000 gallons per day; and this, at 20 gallons per head, would supply a population of 19,000 in a 150 days' drought.

Reduction in the Price of Gas at Peterborough.—The Peterborough Gas Company have announced a rebate in the price of gas to private consumers, of 2d.; making the charge 3s. 4d. per 1000 cubic feet. The Corporation and the Railway Company—the two largest consumers—are to be treated still more liberally; and in future will be charged at the rate of 3s. 2d. A local paper, commenting upon this reduction, says it is "part of the spirited policy of our go-ahead Gas Company, the Directors of which, headed by an excellent Chairman and an energetic Manager (Mr. J. Barton), cater for their customers and the public generally in a manner which may be commended to the notice of other towns of the same size."

The Rotherham Gas Exhibition.—The exhibition of gas appliances at Rotherham was brought to a close on the evening of last Saturday week, when the Mayor presented the certificates awarded to the respective firms exhibiting in the order of merit as adjudged—First class certificates: H. and C. Davis, of London, cooking-stoves; John Wright and Co., of Birmingham, cooking and heating stoves; Charles Wilson and Son, of Leeds, cooking and heating stoves; Yates, Hayward, and Co., of Rotherham, heating-stoves; W. Unsworth, of Warrington, cooking-stoves. Second class certificates: Yates, Hayward, and Co., cooking-stoves; R. and A. Main, of Glasgow, cooking and heating stoves; Greenall and Co., of Manchester, cooking and heating stoves; W. H. Micklethwait and Co., of Rotherham, heating-stoves. Highly commended certificates: W. H. Micklethwait and Co., cooking-stoves; Arden Hill and Co., of Birmingham, heating-stoves; Corbitt and Co., of Rotherham, floor-warming stove. First class certificates were also given to Messrs. Guest and Chrimes, of Rotherham, for regenerative lamp burners, gas-fittings, and valves; Wenham Lamp Company, of Manchester, regenerative lamps and governors; James Stott and Co., of Manchester, regenerative burners and governors; Fourness Regenerative Lamp Company, for their lamps; W. Sugg and Co., regenerative lamp burners; W. B. Watson, of Rotherham, general display of regenerative lamps and other gas appliances; and Mark Liversidge, of Rotherham, water-heater.

The Cardiff Electric Lighting Station to be Closed.—Several users of the electric light at Cardiff have received a circular from the Brush Electrical Engineering Company, Limited, intimating that, in consequence of the rules of the Board of Trade in regard to overhead wires, and the decision of the Corporation of Cardiff not to consent to the application of the Company at present for a Provisional Order enabling them to place their wires underground, the Company have no alternative but to close their station. They state that next year they will renew their application for an Order, and hope then to obtain the consent of the Corporation, when they will be prepared to carry out the electric lighting of Cardiff by means of underground mains.

The Promotion of the Lothammer Gas Company.—Mr. C. E. Parker-Rhodes, the Chairman of the Committee of Investigation *re* the Lothammer Gas Manufacturing Company, has petitioned the House of Commons to order an inquiry into the promotion of the Company, on the ground that it will reveal facts "deserving of consideration in future legislation on public companies." The petitioner asserts that statements were made and published by persons connected with the promotion, which "were known to be untrue, misleading, and intended for fraudulent purposes;" that only 7000 shares were applied for, as against £40,000—shares and cash—to the vendor; and that "while the vendor received 11,663 shares and £2000 in cash, the promoters secured 26,337 shares and £500 in cash from the vendor."

Increase in the Price of Gas at Blackburn.—On Thursday last, at the meeting of the Blackburn Town Council, the Gas Committee recommended that the price of gas to small and large consumers for illuminating purposes be increased 1d. per 1000 cubic feet, subject to discount as heretofore, the increase to commence as from March 25 last. Mr. R. Dixon asked for a reason for the increase. Alderman W. Thompson said it was due to the increased price of coal. The contract for coal was running out in June; and the difference in the price of coal now and what it used to be was £8000 a year. Alderman Whitely said it was creditable to the Gas Committee that they had avoided a still larger increase, as the price of coal had risen a great deal. The increase was slight compared with neighbouring towns.

First Annual Dinner of Wigan Gas-Works Officials.—Last Wednesday evening, the officials engaged at the Wigan Corporation Gas-Works held the first of what they intend to be an annual social gathering, at the Commercial Hotel in the borough. After an excellent dinner, the Chief Clerk (Mr. Best) was called to the chair; and the usual loyal toasts were then honoured. The Chairman of the Gas Committee was also toasted; and the health of "Our Gas Engineer" was enthusiastically pledged. Mr. Jos. Timmins, in the course of his acknowledgment, said he would endeavour to see that the gathering of the officials in this manner should become an annual affair. It was his wish to treat those under his control with that courtesy with which he himself desired to be treated. So far as the men engaged on the works as stokers, firemen, &c., were concerned, he was pleased to see the Gas Committee so unanimous in granting an increase of wages without causing any hitch in the manufacture and supply of gas.

Cookery Lectures at Sidcup.—A series of lectures on cooking by gas was delivered by Miss Kelman, at the Public Hall, Sidcup, on Thursday, Friday, and Saturday of last week. The Secretary and Manager of the Crays Gas Company (Mr. F. M. Edwards), in introducing the lecturer on Thursday, explained the object the Directors had in view in organizing these exhibitions every two or three years; and mentioned the very gratifying success which attended the previous displays. Each season, he said, there was a continued steady demand for stoves, which he attributed to the more perfect knowledge on the part of the consumers as to what could be done by gas. Miss Kelman's lectures were all well patronized and attentively listened to by a large number of ladies, who appeared to greatly appreciate them. The stoves and other appliances which were exhibited during the course of the lectures attracted much attention; and by the large number of inquiries for them, it is confidently anticipated that a good impetus will be given to the hiring business of the Company.

Gas Cooking Lectures at Stoke Newington.—The Gaslight and Coke Company resumed their lectures on cooking by gas, at the Assembly Rooms, Defoe Road, Stoke Newington, last week. These lectures, which are under the superintendence of Mr. T. J. Bird, the Chief Inspector of the North London District, appear to be more popular the more they are given—judging by the large audiences that were present each afternoon and evening. Mrs. R. Wilkinson, the lecturer, has the happy knack of making her remarks interesting as well as instructive; and she demonstrated on each occasion, in a practical manner, the advantages of cooking by means of gas-stoves. The lectures will be continued this week, concluding on Friday evening, the 9th inst. Messrs. H. and C. Davis and Co., Thomas Fletcher and Co., and John Wright and Co., had on show a large number of gas-stoves of every description. Messrs. W. Sugg and Co. had an interesting exhibition of gas apparatus; while the hall was brilliantly lighted with Messrs. H. Greene and Sons' "Meteor" gas-lamps.* Numerous orders were given by the public for gas-stoves.

The Oil Lighting at Erith.—Amicable agreement between the Erith Local Board and the Defries people cannot be said to improve. It appears, says our local correspondent, that where wilful damage to the lamps is proved, the Board are responsible; and as the oil lighting does not advance in the good opinion of the Erithians, lamps continue to be damaged, though such proceedings are not for one moment to be considered praiseworthy. On the question of breakages, however, the Local Board, through their Clerk, have stated that they shall require the fullest proof of wilful damage, to which Mr. Defries has replied that he cannot guarantee that such information shall always be forthcoming, and adds that the Board can no more hold him responsible for not giving immediate information of breakages, than he can hold them responsible for breaking the lamps, though he will do the best he can to supply the information. The upshot of this has been an instruction to the Board's Clerk to inform Mr. Defries that the Board will admit no liability for the damage alleged to have been done, as they are not at all satisfied that there has been wilful damage. How this will work out remains to be seen. There is not the slightest doubt that lamps have been damaged; but the question is how, and also if reasonable precautions against damage have been provided.

The Whitehaven Gas Company's Bill.—This Bill came before a Select Committee of the House of Commons on Wednesday, the 23rd ult. Mr. Balfour Browne, Q.C., Mr. Worsley Taylor, and Mr. Erskine Pollock appeared for the promoters; Mr. Pope, Q.C., and Mr. Pembroke Stephens, Q.C., represented the Whitehaven Trustees, who opposed the Bill. From the evidence adduced in support of the measure, it appeared that the Company since its formation had raised and expended £13,000 of capital, and had spent at least another £13,000 out of revenue, which might have been charged to capital account. When the Company was re-constructed in 1884, the Bransty works were valued at £30,000. New gas-works were bought for £20,000. The Company, it was mentioned, intended to supply electric machines, which would be worked by gas-engines, to private consumers. Evidence was given on behalf of the opponents on the following Friday. Objection was made to the Company having powers to supply electricity, on the ground that, if they had the monopoly of the lighting of the district, the Trustees would be deprived of the opportunity of getting electric lighting introduced; and that, if the electric business did not pay, the gas consumers would be the sufferers. The Committee eventually decided that the preamble of the Bill was proved, but ordered that the illuminating power of the gas should be increased to 15 candles, instead of 14, and the maximum price reduced from 5s. to 4s. 6d. per 1000 cubic feet.

Tarapaca Water-Works Company.—The annual general meeting of this Company was held last Wednesday. The Chairman (Mr. R. Harvey), in moving the adoption of the report, alluded to some adverse criticisms which had appeared in certain newspapers regarding the Company's property and the condition of the water supply; and, at his request, the Secretary read the last report of their Engineer (Mr. W. R. Copeland). This document, among other things, stated that the Company's springs had been yielding daily 204,000 gallons of water for the past seven months, and that they had been supplying the Nitrate Railways Company with a total of 1,887,000 gallons per month, while the whole of the works were in good condition, and practically completed. The Chairman, proceeding, said they must congratulate themselves that the inhabitants of Iquique now numbered 25,000, as against 16,000 when they commenced working; and consequently their receipts, even at the reduced price of water, would be very much in excess of what they calculated at their maximum concession price. They could easily buy more springs if they needed them. A shareholder asked how it was the shares had gone down 50 per cent.; because last year Colonel North told them there was a surprise for them. Was this the surprise intended? The Chairman said he was sorry he could not say anything about that. For the eccentricities of the market, the Directors were not responsible. The report was adopted; and the retiring Directors and Auditors were re-elected.

The Vestry Agitation on the London Water Question.—At last Wednesday's meeting of the St. Saviour's Boad of Works, a report was presented by the Paving and General Purposes Committee, and subsequently adopted. It was to the effect that the Committee had considered the circular-letter from the Vestry of St. James, Westminster, on the subject of the Metropolitan Water Supply, forwarding a copy of a resolution agreeing with a report which was adopted by the London County Council recommending that the Council should introduce into Parliament, during the present session, a Bill for suspending the powers of Water Companies to increase their charges for water consequent upon any increase that may be made in the assessment of property in the County of London in the quinquennial valuations; also forwarding a copy of a resolution passed by the Vestry expressing an opinion that the undertakings of the several Water Companies should be transferred to the London County Council, and a copy of a petition to the House of Commons praying for the whole subject to be taken into early and serious consideration, with a view either to restricting the powers of the Water Companies as suggested in the report above referred to, or the creation of a Parliamentary Commission with ample powers to fix the terms upon which the London County Council may acquire the several undertakings of the Metropolitan Water Companies. The recommendation of the Committee was that a similar petition be presented on behalf of the Board.

Cookery Lectures at Weymouth.—The Weymouth Gas Company have recently had a series of lectures on practical cookery delivered by Miss Garstin, of the National School of Cookery. On the occasion of the first lecture, on Tuesday, the 22nd ult., the Vice-Chairman of the Company (Mr. R. Thomas) took the opportunity, in introducing Miss Garstin, of remarking upon the economy, cleanliness, and handiness of gas for cooking purposes. The Gas Company, he said, were established not only for the benefit of those who had invested capital in it, but also for those who were consumers of gas. As a Company they had already done something in that direction; for whereas the public used to be charged 5s. per 1000 cubic feet for gas, they had now to pay 3s. 10d., and the Directors hoped if they could popularize the use of gas during the daytime, without increasing their expenditure, to be able to make a further reduction. From personal experience, he could testify that gas could be very advantageously used in cooking; but unless proper care was taken in its management, it would be found expensive. One very great point in regard to gas-stoves was their cleanliness and being ready at all times for use. The Company had a large number of stoves on hire; and the satisfaction they afforded was a very material point in their favour. Throughout the course of lectures, which were very instructive, a good attendance was maintained; and much interest was evinced by the visitors in a collection of Messrs. H. and C. Davis and Co.'s stoves and other appliances which were on view.

Buenos Ayres Water and Drainage Company.—The ordinary general meeting of this Company was held at Winchester House, Old Broad Street, E.C., last Tuesday. The balance-sheet presented simply contained a statement of the capital which had been subscribed, and the value of the concession and works executed prior to the date of the

* In notifying last week (p. 798) some of the principal appliances on view at the recent gas exhibitions at Southampton and Oxford, mention should have been made of these "Meteor" gas-lamps, which were shown at both places, and much admired.

contract of Nov. 14, 1888. The sums which the Company had received from their contractors on account of administration expenses, and the expenditure of those sums, were also shown. The Chairman (Mr. H. R. Grenfell), in moving the adoption of the balance-sheet, stated that their Consulting Engineer (Mr. Parsons) had gone out to the River Plate with instructions to send home a detailed report as to the present position of the works. With regard to the additional contract entered into, after examining various reports, the Directors came to the conclusion that in some respects the works that were in process of construction would not be quite sufficient to supply the water and drainage works to 50,000 houses and 400,000 inhabitants. The Board had communicated to the contractors their opinion that, in terms of the contract, they were bound to supply a sufficient amount of water to fulfil the Company's obligations, and that they would have to strengthen the works so as to make them capable of adequately supplying the inhabitants. Negotiations had been going on for some time; and it was only on the previous Tuesday that he signed an additional contract on behalf of the Company. Under this contract they believed they would have an ample supply of water; but they would have to raise fresh capital. The reports and accounts were adopted; and at a special meeting subsequently held, a resolution was passed authorizing the Directors to provide a sinking fund to make provision for recouping the share capital upon the expiration of the concession.

Tampering with a Gas-Meter at Manchester.—At the Manchester County Police Court last Friday, James Hickling, residing at Gorton, was charged, at the instance of the Manchester Corporation Gas Committee, with fraudulently preventing his supply of gas from being registered by the meter. It appeared from the evidence that the attention of the officials of the Gas Department was directed to the Christmas gas account of the defendant, when it was discovered, on comparison with previous accounts, that a considerable diminution had taken place in the consumption. A meter inspector visited the house on March 28, and took the register of the meter in the usual way. A surprise visit was made on April 10; and an examination revealed the fact that an india-rubber tube had been fixed, which prevented the gas from the main passing through the meter. The inspector did not mention the discovery to the defendant at the time, but went at once to the Town Hall to acquaint his superiors. On returning to Hickling's house with the chief inspector and a policeman, it was found that the tube had been removed. The couplings of the pipes between the main and the meter showed signs of having been tampered with. Mr. Cobbett, who appeared for defendant, intimated that his client admitted the offence, and threw himself on the mercy of the Court. He was a man in a very respectable position, and was exceedingly sorry for what he had done. The Stipendiary said that the position of the defendant rather aggravated his offence; and they could not do less than inflict the full penalty of £5 and costs, in addition to the 9s. damage claimed by the prosecution under the Act.

The Public Lighting of Heywood.—At a recent meeting of the Heywood Town Council, a Sub-Committee presented an interesting report, in which a comparison was made between the public lighting of Heywood and the neighbouring towns of Bury, Oldham, Middleton, and Rochdale. They took Bury as the standard of a well-lit town, and pointed out that, in order to be on an equality with it, Heywood would require 10 per cent. more lamps. As to the annual consumption of gas, Heywood stands lower in the scale in quantity than any of the other towns named, except, perhaps, Middleton. The public lamps in Rochdale consume 26 per cent. more gas than those in Heywood; but the cost is less—the price of gas being only 2s. per 1000 cubic feet. The Heywood gas, being made exclusively from coal, cannot, on an average, give more than 16½ candles illuminating power. Oldham and Middleton gas gives 20 candles; Bury and Rochdale gas, 18 candles. Looking at the rateable values, Heywood and Bury are on a footing of equality in regard to street lighting. With a rate for gas equal to that of the surrounding towns, Heywood cannot, it is thought, afford to have more lamps than at present, or have its lighting arrangements very much altered for the better. However, the Sub-Committee feel that the lighting of the lamps can be very much improved; and to effect this, they recommend that for next season two additional men be engaged. The Middleton Corporation are putting into use the very best style of lamp the Sub-Committee have seen, and the results are everything that can be desired in respect to its lighting qualities. They consequently recommend its entire adoption for Heywood, and that some of the new lamps be at once placed in the most public thoroughfares in the town. The consideration of the report was postponed.

The Annual Balance-Sheet of the Rochdale Corporation Gas Department.—The returns of the Rochdale Gas Committee for the year ended March 25 last show that, with a total income of £55,596 (against £53,627 in the previous year), the Committee have secured a net disposable balance, or clear profit available in aid of the rates, amounting to £13,576; being £613 more than that for 1888-9. Of the total income, £39,532 represents gas-rental, and £16,064 receipts for residual products sold. In the preceding year the sums received were £39,753 as gas-rental, and £13,874 for residuals. An interesting and highly satisfactory result is obtained on comparing the receipts from the gas-works during the last quarter of the year (January to March) with those of the corresponding portion of 1889. These are the only two quarters of the two years which can be fairly placed in comparison; the last reduction in the price charged for gas supplied by the Corporation having affected only the last three months of the financial year 1888-9. For the quarter ended in March, 1889, the return in the way of gas-rental amounted to £13,331; whereas that for the corresponding part of the year just closed was £14,248—an increase of £917. The increase in the profit, in face of the reduction of 6d. per 1000 cubic feet which was made last year, has afforded much gratification to the advocates of that policy. At last Thursday's meeting of the Town Council, after the minutes of the Gas Committee were read, Mr. Sharp said that there was last year a deficit of £10,000 on the water-works, which was less than the previous year; but the profit on the gas-works amounted to £13,000. He wished to know if the Gas Committee could make a further reduction in the price of gas. Mr. Alderman Petrie, the Chairman of the Committee, replied that they anticipated a considerable advance in the price of coal as compared with their previous contracts. During the last four or five months, there had been £700 increase in the cost of labour, and a large outlay on the works; therefore it was premature to promise a further reduction in the charge for gas.

Mr. E. M. Eaton and the Water Supply of the Chesterfield District.—Mr. E. M. Eaton, Assoc. M. Inst. C.E., Engineer of the Sheffield Corporation Water-Works, who resides at Mosbro' Hall, Eckington, lately addressed a letter to the Clerk of the Chesterfield Rural Sanitary Authority, in which he called attention to the "utterly insufficient and irregular supply of water" afforded from the pipes of the Authority. Referring to the complaints in the district as to the injury caused by lead in solution in the water, he said it might be taken as a fact that the action of water upon lead pipes was enormously increased (from three to ten fold according to circumstances) by the pipes being alternately filled with water and emptied, so as to admit access of the atmosphere. The intermittent and irregular supply of water was, in his judgment, very largely the cause of the numerous cases of lead-poisoning alleged to have occurred in Mosbro' and Killamarsh. He further added that he was well convinced that insufficient capacity of pipes and negligent management were the causes which operated to produce the effects of which he complained. At the last meeting of the Sanitary Authority, the report presented by the Engineer (Mr. J. Frith), contained some observations on Mr. Eaton's letter. He admitted that he had had some trouble with the water in the Killamarsh and Mosbro' districts; but it was now being well supplied. Mr. Eaton's letter, he thought, contained some "hidden meaning;" and he regarded it as a "direct attack on his management." As to the capacity of the mains, Mr. Frith did not think that Mr. Eaton would have made any remark about their incapacity had he known that for a number of years they efficiently supplied 10,000 more people than they were doing at present. With regard to lead-poisoning, Mr. Eaton, he says, ought to be an authority; but when he attributed the cause of it in the Authority's district to negligent management, he (Mr. Frith) was surprised at there being any lead-poisoning in the Sheffield district. After remarks on the matter from various members of the Authority, the Clerk was instructed to reply to Mr. Eaton's letter.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

For Stock Market Intelligence, see ante, p. 831.

Issue.	Share	When ex-Dividend.	Dividend or Div. & Bonus.	NAME.	Paid per Share	Closing Prices.	Rise or Fall in Wk.	Yield upon investment.
£			p. c.	GAS COMPANIES.				£ s. d.
590,000	10	16 Apr.	10½	Alliance & Dublin 10 p. c.	10	17–18	..	5 16 8
100,000	10	,,	7½	Do. 7 p. c.	10	11½–12½	..	6 0 0
300,000	100	2 Jan.	5	Australian (Sydney) 5 % Deb.	100	109–111	..	4 10 1
100,000	20	28 Nov.	8	Bahia, Limited	20	20–21	..	7 12 4
200,000	5	14 Nov.	7½	Bombay, Limited	5	6⅞–7⅛	+⅛	5 3 5
40,000	5	,,	7½	Do. New	4	5–5⅛	+⅛	5 9 1
380,000	Stck.	27 Feb.	12½	Brentford Consolidated	100	218–223	..	5 9 10
125,000	,,	,,	9½	Do. New	100	160–165	..	5 12 2
220,000	20	13 Mar.	11	Brighton & Hove Original	20	40–42	..	5 4 9
320,000	20	28 Mar.	11½	British	20	44–46	..	4 17 10
50,000	10	13 Mar.	11	Bromley, Ordinary 10 p. c.	10	18–20	..	5 10 0
39,000	10	,,	8	Do. 7 p. c.	10	13–14	..	5 14 3
328,750	10	14 Nov.	10	Buenos Ayres (New) Limited	10	12–13	..	7 13 10
200,000	100	2 Jan.	6	Do. 6 p. c. Deb.	100	105–108	..	5 11 1
150,000	20	27 Feb.	8	Cagliari, Limited	20	25–27	..	5 18 4
550,000	Stck.	16 Apr.	13⅜	Commercial, Old Stock	100	249–254	+2	5 8 3
130,000	,,	,,	10½	Do. New do.	100	200–205	..	5 4 10
130,000	,,	30 Dec.	4½	Do. 4½ p. c. Deb. do.	100	118–123	..	3 13 2
557,320	20	12 Dec.	13	Continental Union, Limited	20	46–48	..	5 8 4
242,680	20	,,	13	Do. New '69 & '72	14	32–34	..	5 6 7
200,000	20	,,	10	Do. 7 p. c. Pref.	20	37–39	..	5 2 6
75,000	Stck.	28 Mar.	10	Crystal Palace District	100	195–205	..	4 17 7
234,060	10	30 Jan.	13	European, Limited	10	25–27	..	4 16 4
120,000	10	,,	13	Do. New	7½	18–19	..	5 2 10
354,060	10	,,	13	Do. do.	5	12½–13½	..	4 16 4
5,470,620	Stck.	13 Feb.	13¾	Gaslight & Coke, A, Ordinary	100	247–252	..	5 9 1
100,000	,,	,,	4	Do. B, 4 p. c. max.	100	100–103	..	3 17 8
665,000	,,	,,	10	Do. C, D, & E, 10 p.c. Pf.	100	253–258	..	3 17 6
30,000	,,	,,	5	Do. F, 5 p. c. Prf.	100	121–125	..	4 0 0
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	100	180–185	..	4 1 1
1,300,000	,,	,,	7	Do. H, 7 p. c. max.	100	162–166	..	4 4 4
463,000	,,	,,	10	Do. J, 10 p. c. Prf.	100	253–258	..	3 17 6
1,061,150	,,	12 Dec.	4	Do. 4 p. c. Deb. Stk.	100	117–122	+2	3 5 7
294,850	,,	,,	4½	Do. 4½ p. c. do.	100	125–130	+3	3 9 3
650,000	,,	,,	6	Do. 6 p. c. do.	100	160–170	..	3 10 7
3,800,000	Stck.	14 Nov.	12	Imperial Continental	100	222–226	–1	5 6 2
75,000	5	12 Dec.	6	Malta & Mediterranean, Ltd.	5	5–5⅛	..	5 9 1
560,000	100	1 Apr.	5	Met. of Melbourne, 5 p. c. Deb.	100	112–114	..	4 7 9
541,920	20	28 Nov.	6	Monte Video, Limited	20	19–20	..	6 0 0
150,000	5	28 Nov.	10	Oriental, Limited	5	8⅞–9⅛	..	5 8 1
60,000	5	28 Mar.	7	Ottoman, Limited	5	5⅞–6	..	5 16 8
166,870	10	26 July	4	Pará Limited	10	3⅜–4⅛	..	5 17 9
420,000	100	2 May	6	People's Gas of Chicago— 1st Mtg. Bds.	100	98-102*	..	3 17 8
500,000	100	2 Dec.	6	2nd Do.	100	95–100	..	6 0 0
100,000	10	16 Apr.	10	San Paulo, Limited	10	14⅛–15⅛	+⅛	6 9 2
500,000	Stck.	27 Feb.	13½	South Metropolitan, A Stock	100	280–290	..	4 11 5
1,350,800	,,	,,	11½	Do. B do.	100	225–235	..	4 17 10
141,500	,,	,,	12	Do. C do.	100	240–245	..	4 17 11
650,000	,,	30 Dec.	5	Do. 5 p. c. Deb. Stk.	100	140–145	..	3 9 0
60,000	5	27 Feb.	11½	Tottenham & Edm'nton, Orig.	5	11–13	..	4 8 5
						*Ex div.		
				WATER COMPANIES.				
728,446	Stck.	30 Dec.	9½	Chelsea, Ordinary	100	260–265	..	3 11 8
1,720,560	Stck.	16 Apr.	7½	East London, Ordinary	100	209–212	+2	3 10 9
544,440	,,	30 Dec.	4½	Do. 4½ p. c. Deb. Stk.	100	143–148	..	3 0 10
700,000	50	12 Dec.	9	Grand Junction	50	123–127	..	3 10 10
708,000	Stck.	13 Feb.	10½	Kent	100	271–276	..	3 16 0
1,043,800	100	30 Dec.	9½	Lambeth, 10 p. c. max.	100	254–258	..	3 13 7
406,200	100	,,	7½	Do. 7½ p. c. max.	100	197–202	..	3 14 3
200,000	Stck.	28 Mar.	4	Do. 4 p. c. Deb. Stk.	100	122–125	..	3 3 0
500,000	100	13 Feb.	12½	New River, New Shares	100	363–368	..	3 5 10
1,000,000	Stck.	30 Jan.	4	Do. 4 p. c. Deb. Stk	100	127–130	..	3 1 6
902,300	Stck.	12 Dec.	6	S'thwk & V'xhall, 10 p. c. max.	100	163–167	..	3 11 10
126,500	100	,,	6	Do. 7½ p. c. do.	100	155–160	+1	4 15 0
1,155,066	Stck	12 Dec.	10	West Middlesex	100	260–265	..	3 15 6

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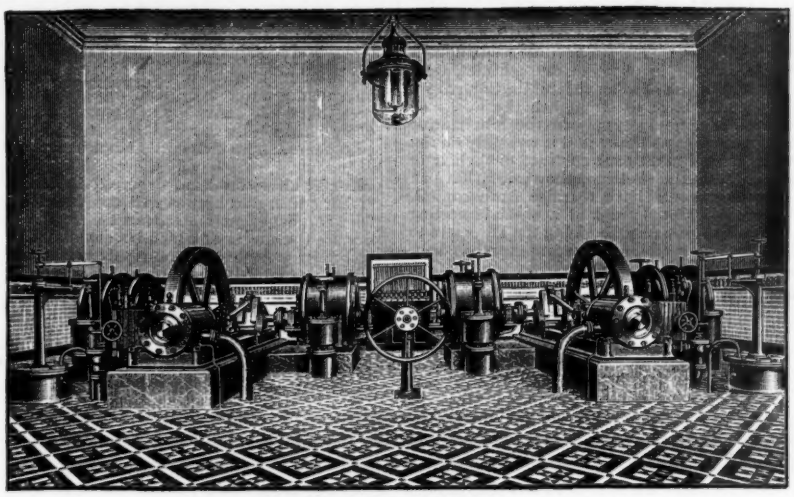

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WORKING MANAGER Wanted (not over 30 years of age), to take charge of small Works. Help in winter. £1 per week with House, Coal, and Gas.

Apply, with reference and full particulars, to the SECRETARY, Gas Company, South Petherton, SOMERSET.

WANTED, two 9-inch Four-Way Valves, and one 16-inch BEALE'S PATTERN EXHAUSTER, second-hand, but in good condition. Also One 8-Horse CORNISH BOILER, with Fittings complete. Must be in perfect state of repair.

Send particulars to Mr. SAMUEL DAWES, Gas-Works, CLEVEDON.

IRISH BOG ORE OXIDE OF IRON.

GAS PURIFICATION.

BALE, BAKER, & CO., direct Importers from Ireland. Sample and Price on application. Spent Oxide and Sulphate of Ammonia purchased. 120 and 121, NEWGATE STREET, LONDON, E.C.

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Chemical Works, LEEDS, specially produce this ACID for making SULPHATE OF AMMONIA of high quality and colour. *Delivery in Railway Tank-Wagons or Carboys*

Highest References and all particulars supplied on application.

COZE'S Automatic Apparatus for CHARGING AND DISCHARGING GAS-RETORTS. For Illustrated Advertisement of this System, see p. 614.

Inquiries should be addressed to THE COZE SYNDICATE, LIMITED, 86-88A, LEADENHALL STREET, E.C.

SULPHURIC ACID.

HUGH WALLACE & CO., Chemical Manufacturers (the old-established firm), supply the above, which is specially adapted for making White Sulphate of Ammonia. The latter purchased in any quantities at highest market prices, or contracts for the year.

For price and terms apply Botolph House, Eastcheap, LONDON, E.C.

EXTRACT from the Harrogate Gas Company's Report, dated the 5th of February, 1890: Coal consumed, 8600 tons. Gas made, 92,880,000 feet; ditto sold, 84,830,000 feet; ditto unaccounted for, 8,000,000 feet; quantity made per ton, 10,800 feet; ditto sold, 9859 feet. Illuminating Power, 16·1 candles. Coals used, Brancepeth. Owners, Strakers and Love, Newcastle-on-Tyne; who have also Brandon Hutton Seam Unscreened Gas Coal. Analysis, 10,500 cubic feet per ton; Illuminating Power, 16·2 candles.

WANTED, a Stoker. One who understands Engine and Exhauster preferred. Twelve-Hour System. Near London.

State wages and particulars to No. 1819, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, lowest price for 100 tons of PITCH COKES (for delivery within the next Three months), delivered to the Railway Station, West Bromwich.

Address No. 1807, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE—A quantity of H-Pipes, Dip- PIPES (5 inches diameter), and HYDRAULICS.

Apply to J. LAYCOCK, Gas-Works, KEIGHLEY.

TO BE SOLD—A Single-Lift Gasholder, 45 feet diameter by 15 feet deep; in good condition.

Apply to CHARLES ELLIOTT, Gas Manager, Leyland, near PRESTON.

STATION METER (second-hand), which passes 100,000 cubic feet of Gas per hour, in Square Cast-Iron Case, FOR SALE.

Apply to R. LAIDLAW AND SON, Simon Square Works, EDINBURGH.

FOR SALE—One Single Gasholder, 80 feet by 20 feet (owing to extensions at Blackpool). To be erected complete; in first-rate condition.
Apply to CLAYTON, SON, AND CO., LIMITED, Hunslet, LEEDS.

THE Stourbridge Gas Company have FOR SALE a quantity of RETORT MOUTHPIECES, ASCENSION-PIPES, H-PIPES, HYDRAULIC MAINS, and VALVES. May be bought cheap.
For particulars apply to the MANAGER.

FOR SALE—A Kirkham, Hulett, and Chandler's WASHER-SCRUBBER, of a capacity of 300,000 cubic feet per day; also a 12-inch GOVERNOR by Peebles.
Can be seen at work on application to F. C. HUMPHRYS, Gas-Works, ILKESTON.

FOR SALE, Price £20—A 5000 feet per hour EXHAUSTER, and Two 8-inch VALVES. All in thorough good order. Removed to make room for larger ones. Can be seen in London by appointment.
Apply in first instance, by letter, to No. 1812, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE—Two second-hand Boilers, without internal Flues. Past use for Steam purposes, but useful for Liquor storeage for small Works, or for transportation of Residua's on a truck. Can be delivered by Canal or Rail.
For further particulars, apply to the ENGINEER and MANAGER of the Gas-Works, Uxbridge, MIDDLESEX.

FOR SALE—One 8-horse power Engine and COAL BREAKER, with top and bottom Elevator, Gear, and Patent Wrought-Iron Chain, with Malleable Iron Buckets complete.
The above Machinery is almost new, having only been in use about Three months.
For further particulars, apply to the COAL DISTILLATION COMPANY—COOPER'S PATENTS—LIMITED, 322 and 323, Winchester House, Old Broad Street, LONDON, E.C.

THE St. Andrews Gas Company have FOR SALE a GAS CONDENSER, taken down to be replaced by a larger one—Two Cast-Iron Boxes in four lengths each, with four Faucets for 9-inch Pipes in each length, or 32 Pipes in all, with double connecting Breek Pipes at top. The whole is in good condition. Suitable for Works making under 20 million cubic feet. Will be sold cheap.
J. HALL, Manager.
Gas-Works, St. Andrews, April 15, 1890.

THE Directors of the North Bierley Gas Company have FOR SALE (cheap) two PURIFIERS, 18 ft. by 11 ft., with Covers, Lifting Gear, 12-inch Connections, and two 12-inch Four-Way Valves, in good condition.
The Boxes may be seen, and further information obtained, on application to Mr. W. Oldfield, Manager.
By order,
EPHRAIM SUCKSMITH, Secretary.
Gas-Works, Oakenshaw, near Bradford,
April 26, 1890.

FOR SALE—One Single Gasholder, 80 feet diameter by 20 feet deep, ten Cast-Iron Columns and Wrought-Iron Girders.
Also four PURIFIERS in a group, 16 ft. by 12 ft. by 3 ft. 9 in. deep; 12-inch Centre-Valve and Connections.
Would erect the above, and make practically equal to new.
Inquiries invited for various second-hand Gas Plant—Gasholders, Tanks, Purifiers, Washers, Exhausters, Station Meters, &c.
Apply to SAML. WHILE (late Ashmore and While), 60, Queen Victoria Street, LONDON, E.C.

SOUTH SHIELDS GAS COMPANY.

SALE OF GAS STOCK.

T. GLOVER & SON are instructed by the Gas Company to SELL by PUBLIC AUCTION, in the Board-Room, at the Gas Offices, Chapter Row, South Shields, on Friday, May 16, 1890, at One o'clock prompt, £8000 of NEW STOCK, under the South Shields Gas Act, 1886.
The Stock will be put up in Lots of £10 each nominal value.
A deposit of 10 per cent. to be paid on the Purchase-Money at the Sale; the remainder to be paid on or before the 30th day of June next.
If the Purchaser pays the full amount at the time of Sale, he will be entitled to interest thereon at the rate of 4 per cent. per annum up to and payable on the 30th of June, 1890.
The Dividend has been 10 per cent. during the past Seven years.
By order of the Directors,
J. H. PENNEY, Secretary.
Gas Offices, Chapter Row, South Shields.

TENDER FOR GAS COAL.

THE Directors of the Cheltenham Gas- light and Coke Company are prepared to receive TENDERS for the supply of COAL during a period of Twelve months from the 1st of August next.
Particulars may be obtained from the undersigned, to whom tenders, endorsed "Tender for Coal," must be delivered on or before Tuesday, the 20th of May next.
R. O. PATERSON, Engineer.
Gas-Works, Cheltenham,
April 25, 1890.

YEOVIL GAS AND COKE COMPANY, LIMITED.

THE Directors of the above Company invite TENDERS for the Supply of 1000, 2000, or 3000 tons of good GAS COAL delivered free at the Town Station, L. & S. W. R., at Yeovil, in such quantities as may be required by the Manager for One year, commencing on the 1st of July next.
Parties tendering to state prices in Gas Company's and Colliery wagons.
Tenders by the 24th inst.
No tender necessarily accepted.
EDWD. HOWELL, Manager.
Gas-Works, Yeovil, May 1, 1890.

FOR SALE—Seven Purifiers, 15 feet square, with Sieves, Connections, Valves, and Lifting Apparatus complete.
One PURIFIER, 20 ft. by 16 ft., with Sieves, Connections, Valves, and Lifting Apparatus complete.
One SCRUBBER, 20 ft. by 6 ft. diameter.
(The above may now be seen at work.)
Two Wrought-Iron TANKS, 8 feet diameter by 7 feet and 6 feet respectively.
One REID'S GAS WASHER.
Two Cast-Iron TANKS, 15 ft. 8 in. diameter by 11 ft. 4 in. and 8 ft. 6 in. respectively.
Two EXHAUSTERS (Jones), equal to 25,000 cubic feet per hour.
A number of 15-inch and other VALVES.
A quantity of SHAFTING and PULLEYS.
J. HEPWORTH.
Gas-Works, Carlisle, April 28, 1890.

TO TAR DISTILLERS AND MANUFACTURING CHEMISTS.

THE Directors of the Wellington (Salop) Coal and Gaslight Company invite TENDERS for the purchase of the surplus TAR to be produced at their Works for One year from the 1st of June next.
Particulars may be obtained from the undersigned, to whom tenders should be sent on or before May 20.
JNO. C. BELTON, Manager.
Gas Office, Market Street, Wellington,
Salop, April 30, 1890.

THE Directors of the Camborne Gas Company, Limited, are prepared to receive TENDERS for the supply of about 350 yards of 4-inch, about 500 yards of 3-inch, and 250 yards of 2-inch plain Socket PIPES. The 4-inch and 3-inch Pipes are to be in 9-feet lengths, and the 2-inch in 6-feet lengths. The whole are to be coated inside and out; and each pipe tested, and guaranteed sound. Price to include delivery into truck at Hayle or Portreath.
Specification as to weight, &c., to be sent with tender, which should be addressed to the Secretary, not later than Saturday, the 10th inst.
The lowest or any tender not necessarily accepted.

TENDER FOR COAL.

THE Scarborough Gas Company invite TENDERS for the supply of about 16,000 tons, or upwards, of Best Screened SILKSTONE GAS COAL or COBBLES per annum for One or Two years, from the 1st day of July next.
Tenders, endorsed "Tender for Coal," must be delivered at the Company's Offices not later than Ten o'clock a.m. on Monday, the 12th day of May next.
The Directors do not bind themselves to accept the lowest or any tender.
By order,
WILLIAM J. MOON,
Secretary and Manager.
Scarborough, April 21, 1890.

TO CHEMICAL MANUFACTURERS, TAR DISTILLERS, AND OTHERS.

THE Directors of the Shipley Gaslight Company are prepared to receive TENDERS for the purchase of their surplus TAR for One year, from the 1st of July, 1890.
The Company will load f.o.b the Leeds and Liverpool Canal at Shipley, or into the Contractor's Tanks at the Great Northern or Midland Station, Shipley.
The quantity of Coal carbonized in Twelve months is about 13,000 tons.
Any further information can be had on application to the Manager.
Sealed tenders, stating price per ton, and endorsed "Tender for Tar," to be sent in on or before the 13th of May, 1890.
JOHN WILCOCK, Manager.
Gas-Works, Shipley, May 1, 1890.

ATHERTON LOCAL BOARD GAS-WORKS.

TO GASHOLDER MAKERS.

THE Atherton Local Board are pre- pared to receive TENDERS for the TELESCOPING of a GASHOLDER on their Premises at Atherton.
The drawings and specification may be seen at my Office, and at the Office of Mr. Thomas Newbigging, C.E., 5, Norfolk Street, Manchester.
Copies of the bill of quantities and form of tender may be obtained from the said Engineer on deposit of Two Guineas, which will be returned on receipt of a *bonâ fide* tender.
Sealed tenders, endorsed "Gasholder," to be delivered to me not later than Tuesday, the 13th day of May next.
The Board do not bind themselves to accept the lowest or any tender.
By order,
D. SCHOFIELD, Clerk.
Local Board Offices, Atherton, Lancs.
April 30, 1890.

TAR AND AMMONIA WATER.

THE Directors of the Loughborough Gas Company are prepared to receive TENDERS for the surplus TAR and AMMONIA WATER to be produced at their Works for One, Two, or Three years from the 30th day of June, 1890.
The estimated quantity will be about 350 tons of Tar, and 900 tons of Ammonia Water.
The Tar and Liquor to be delivered into the Contractors' Boats at the Wharf on the Derby Road, Loughborough.
The strength of the Liquor to be tested by Twaddell's Hydrometer (temperature 60°); and tenders to state the price per ton to be paid for every ½° of strength from 4°.
The Boats for the removal of the Tar and Ammonia Water to be sent at such times as may be required.
Payments monthly.
Further information may be obtained on application to the undersigned, to whom tenders, in accordance with this advertisement, must be sent not later than the 20th of May, 1890.
The Directors do not bind themselves to accept the highest or any tender.
J. B. BALL, C.E., Manager.
Loughborough, April 30, 1890.

TENDERS FOR GAS COAL.

THE Directors of the Maidstone Gas Company are prepared to receive TENDERS for the supply and delivery of 15,000 tons of GAS COAL during a period of One year, commencing the 1st of July next.
Particulars and forms of tender may be obtained from the undersigned.
Tenders, endorsed "Tender for Coal," to be addressed to the Chairman, and delivered not later than Ten a.m. on Thursday, the 29th inst.
H. SMYTHE, Engineer and Manager.
Gas-Works, Maidstone, May 1, 1890.

BRISTOL UNITED GASLIGHT COMPANY.

TENDERS FOR GAS COAL AND CANNEL.

THE Directors of the above Company are prepared to receive TENDERS for the supply of their requirements (say, 150,000 tons) of GAS COAL during a period of One year, commencing the 1st of July next.
Particulars and forms of tender may be obtained on application to the undersigned, to whom also tenders, sealed and endorsed "Tender for Coal," must be delivered not later than Ten a.m., on Monday, the 19th day of May next.
JAS. V. GREEN, Secretary.
Gaslight Offices, Canons' Marsh,
Bristol, April 9, 1890.

STAINES AND EGHAM DISTRICT GAS AND COKE COMPANY, LIMITED.

THE Directors of this Company invite TENDERS for the supply and delivery during the year 1890-91 of 6000 tons of EAST PONTOP or PELAW MAIN GAS COALS to be delivered in quantities per month as ordered by the Company's Manager.
The year will commence on the 1st of October next, and end on the 30th of September following.
The Company's Works are on the bank of the Thames, and outside the City Coal Dues Boundary.
The Coals must be thoroughly screened, and free from Slates and Bats.
Tenders to be sent to the undersigned on or before the 31st of May inst.
JOHN ANTHONY ENGALL,
Solicitor and Secretary.
Staines, May 3, 1890.

TO TAR DISTILLERS, MANUFACTURING CHEMISTS, AND OTHERS.

THE Directors of the Rochester, Chat- ham, and Strood Gaslight Company, are prepared to receive TENDERS for the purchase of the surplus TAR and AMMONIACAL LIQUOR produced at their Works at Rochester and at Gillingham, for One, Two, or Three years, commencing the 1st of July next.
In the last Twelve months, the quantity of Tar was about 290,000 gallons; of Liquor, about 800,000 gallons.
Further particulars may be had on application at the Office of the Company, 58, High Street, Rochester.
Tenders may be for Tar or Liquor separately or together, and are to be delivered at the Office, marked "Tender for Tar" or "Liquor," not later than noon of Thursday, the 22nd of May.
The Directors do not bind themselves to accept the highest or any tender; and security for due fulfilment of the contract must be given if required.
WILLIAM SIMS, Secretary and Manager.
Gas Office, 58, High Street, Rochester,
April 29, 1890.

TO COLLIERY PROPRIETORS AND OTHERS.

THE Corporation of Birkenhead are prepared to receive TENDERS for the supply of SCREENED COAL, COAL NUTS, CANNEL and CANNEL NUTS, for Gas-Making purposes, for a period of Twelve months, commencing from the 25th of June, 1890.
Forms of tender, together with any further information, may be obtained from Mr. T. O. Paterson, C.E., Gas Engineer, Gas-Works, Birkenhead.
Tenders, stating the price per ton delivered on to the Gas-Works Railway Siding, must be sent in to me, sealed and endorsed "Tender for Gas-Works Coal," not later than Five o'clock in the afternoon of Friday, the 6th of June, 1890.
Also for a supply of STEAM COAL and SLACK, to be delivered at the Pumping-Stations of the Spr nghill, Flaybrick Hill, and Borough Road Water-Works, for a period of Twelve months, commencing from the 25th of June, 1890.
Forms of tender and any further information may be obtained from Mr. W. A. Richardson, C.E., Water Engineer, Town Hall, Birkenhead.
Tenders, stating the price per ton delivered at the various Pumping-Stations, must be sent in to me, sealed and endorsed "Tender for Water-Works Coal," not later than Five o'clock in the afternoon of Friday the 6th of June, 1890.
Deliveries to be made from time to time according to the requirements of the respective Engineers.
The Corporation do not bind themselves to accept the lowest or any tender.
By order,
ALFRED GILL, Town Clerk.
Town Hall, Birkenhead, May 3, 1890.

TO TAR DISTILLERS AND OTHERS.

THE Corporation of Birkenhead invite OFFERS for the Purchase and Removal of the Surplus TAR produced at their Gas-Works during periods of One, Three, or Five years, commencing from the 1st of July, 1890.
Deliveries will be made at the Works either into Contractor's Tanks on the Gas-Works Railway Siding, or into Tanks at the Gas-Works for conveyance by road to boats.
Forms of tender and further particulars may be obtained from the Gas Engineer, Mr. T. O. Paterson, Gas-Works, Thomas Street.
Tenders, sealed and endorsed "Tender for Tar," to be sent in to me not later than Five o'clock in the afternoon of Friday, the 30th of May, 1890.
The Corporation do not bind themselves to accept the highest or any offer.
By order,
ALFRED GILL, Town Clerk.
Town Hall, Birkenhead, May 3, 1890.

TAR AND AMMONIACAL LIQUOR.

THE Directors of the Accrington Gas and Water Works Company invite TENDERS for the purchase of the surplus TAR and AMMONIACAL LIQUOR which may be produced at their Works, Accrington and Great Harwood, during One year, commencing on the 1st of July next, and terminating on the 30th of June, 1891.

The quantity of Tar it is estimated will be about 1300 tons; and Ammoniacal Liquor, about 2800 tons.

Additional particulars may be obtained on application to the undersigned.

Tenders, sealed, and endorsed "Tender for Tar and Liquor," and addressed to the Chairman, must be delivered not later than Wednesday morning, the 28th of May.

The Directors do not bind themselves to accept the highest or any tender.

By order,
CHAS. HARRISON, Secretary.

Offices of the Company, Hyndburn Road,
Accrington, April 21, 1890.

YATTON GAS CONSUMERS' COMPANY, LIMITED.

TENDERS are invited for the supply and fixing at Yatton, in the county of Somerset, of—

One BENCH of Four 16-inch Round RETORTS, 9 feet long, with Flue and Sight Boxes, Furnace Door, and Ash-Pan complete (no other Ironwork).

Two PURIFIERS, 5 feet square, to be worked together or singly, with 5-inch Valves and Connections complete.*

One STATION METER, to pass 4000 cubic feet of Gas per hour, with 5-inch Valves and Connections complete.*

One 5-inch GOVERNOR, with Bye-Pass Valve and Connections complete.*

One GASHOLDER 35 ft. by 10 ft., with Columns, Girders, Valves, Inlet and Outlet Pipes complete.*

One IRON ROOF for Retort-House, with Louvres, to span House 25 ft. by 16 ft.*

Plans, specifications, and tenders to be sent to Mr. Samuel Dawes, Clevedon, on or before Thursday, the 8th day of May, 1890.

* Where second hand, state reduction in price as compared with new.

CORPORATION OF NOTTINGHAM.
(GAS DEPARTMENT.)

TENDERS FOR COALS.

THE Gas Committee are desirous to receive OFFERS for supplies of COALS, COBBLES, or NUTS, for the period terminating the 30th of June, 1891.

The Large Coals and the Cobbles or Nuts are to be separately delivered, where and as from time to time directed, by and at the expense of the Contractors, upon the Gas-Works Siding, Great Northern Railway, in the East Croft, at Nottingham, and also on the Gas-Works Sidings, Midland Railway, at Radford and Basford respectively; and at and after the rate of one-eighth part of such total quantity in each calendar month, commencing with the month of July next, till the Corporation shall be satisfied with the amount of accumulated Stock, and afterwards at such rate as shall be from time to time directed, till the agreed quantity shall have been delivered.

The Coals, Cobbles, or Nuts are to be the best of their respective kinds, *well screened* (description, sizes, and inclination of screen to be specified), to be as free as possible from Sulphur, Bats, Bind, Refuse, and Dirt, and shall be weighed (20 cwt. to the ton) upon the Corporation Machines, or upon such other Machines as may be mutually agreed upon.

Payments will be made monthly, if and so long as the contract shall be duly fulfilled.

The Corporation do not bind themselves to accept the lowest or any tender.

Further information and forms on which the tenders must be made, may be obtained on application to me, at the General Manager's Office; and the tenders (sealed) specifying the description of coals and the pits at which they are to be raised, and stating the prices for deliveries at the several places, and in manner and subject to the conditions aforesaid, must be delivered to Samuel George Johnson, Esq., Town Clerk, on or before Monday, the 19th day of May, 1890.

By order,
WILLIAM R. CHESTER,
Engineer and General Manager.

Corporation Gas Offices, George Street,
Nottingham, May 5, 1890.

TO PIPE FOUNDERS.

THE Directors of the North Bierley Gas Company are prepared to receive TENDERS for 1430 yards of 8-inch plane SOCKET PIPES in 9-feet lengths.

Particulars may be obtained on application to Mr. W. Oldfield, Manager.

Tenders to be sent in, addressed to the Chairman, on or before the 8th day of May, 1890.

By order,
EPHRAIM SUCKSMITH, Secretary.

Gas-Works, Oakenshaw, near Bradford,
April 26, 1890.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their Inventions may be secured for Twelve months; or LETTERS PATENT, which are granted for Fourteen Years.

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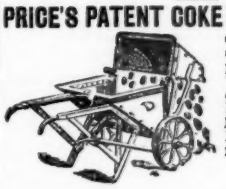

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NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with bolts, nuts, and covers, and rendering leakage impossible.

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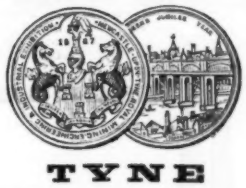

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Illuminating Power	38·22 candles.
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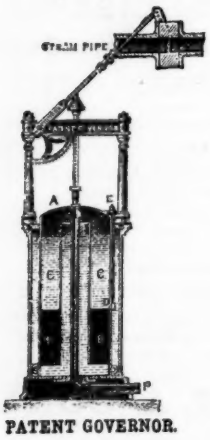

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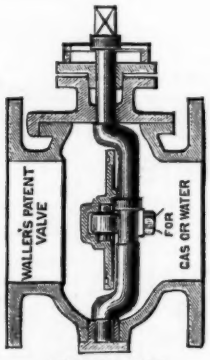

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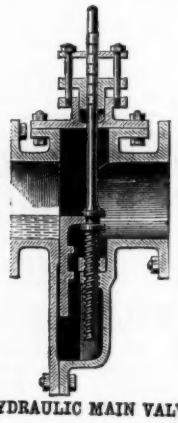

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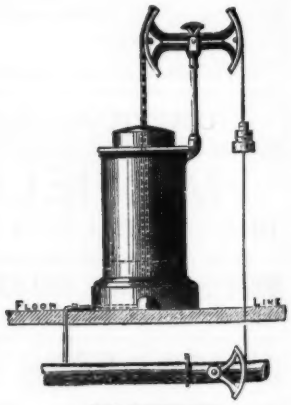

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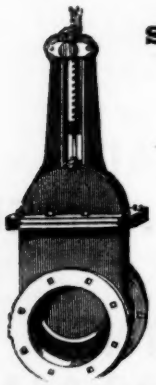

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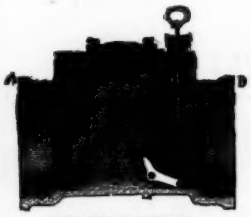

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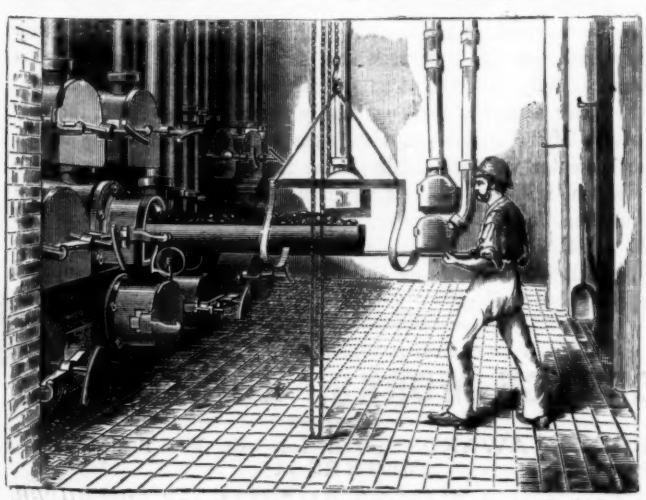

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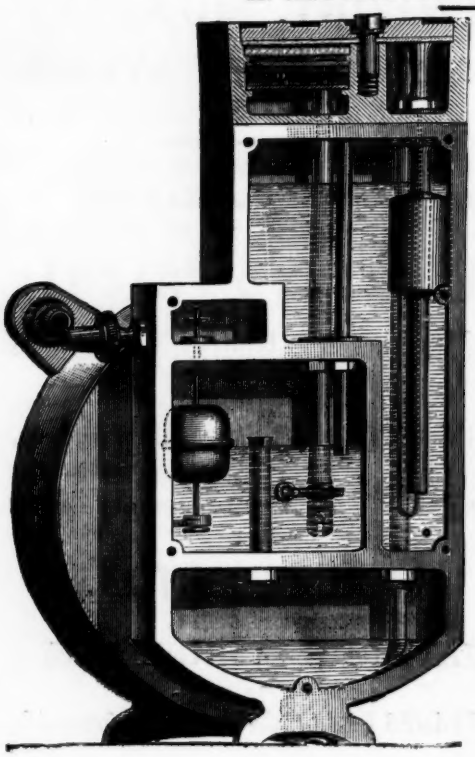

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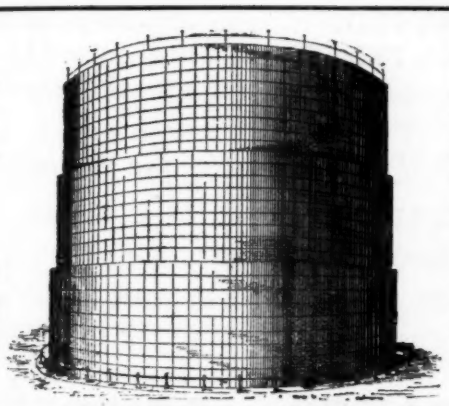

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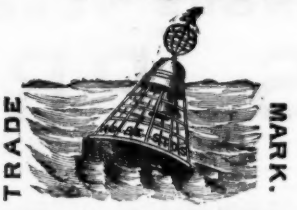

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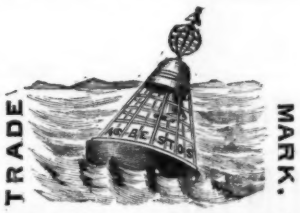

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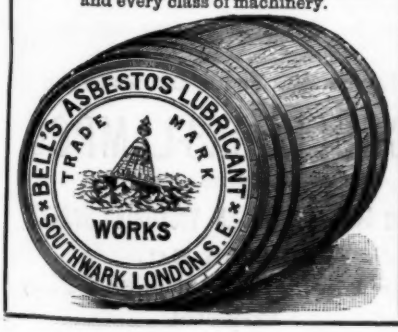
For Steam-Engines & Cylinders, Gas-Engines, and every class of machinery.



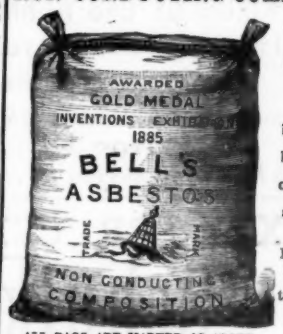
BELL'S ASBESTOLINE
The reputation of this Lubricant is based on the experience of thousands of users, which places it far in advance of those who rely only on mere laboratory tests.

ASBESTOLINE IS THE CHEAPEST MOST EFFICIENT, CLEANEST MOST INODOROUS AND SAFEST LUBRICANT.

ASBESTOLINE HAS SAVED 90 PER CENT. OVER OIL.
Has been used for all purposes, AND BEATEN ALL OTHER LUBRICANTS IN ACTUAL WORK.

BELL'S ASBESTOS
EXPANSION SHEETING
RINGS, AND TAPE.
Is the most efficient and reliable Material for Manhole, Mudhole, Steam-Pipe, and all other Joints.

BELL'S ASBESTOS
NON-CONDUCTING COMPOSITION.



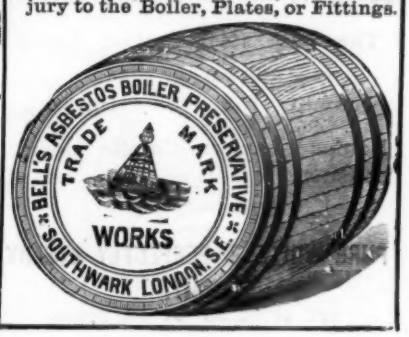
Will reduce loss by radiation, and saves 40 per cent. of fuel.

Is suitable for boilers with flat or round bottoms. Is superior to any other, and saves its cost in a few months.

Is sent out dry in bags; therefore cheaper than others sent out wet.

ALL BAGS ARE MARKED AS ABOVE.

BELL'S ASBESTOS
BOILER PRESERVATIVE
Will effectually keep Boilers clean, and remove any Incrustation, without injury to the Boiler, Plates, or Fittings.



THE
ÉTOILE GAS-LAMP
(REGENERATOR).

Sole Makers and Proprietors,
THE ÉTOILE GAS-LAMP COMPANY,
Gas Lighting and Ventilating Engineers,
PRINCESS STREET, **MANCHESTER.**
LISTS ON APPLICATION.

PATENT GLASS LAMPS & COVERS
For Streets, Railway Platforms, &c., &c.

(Patented the 4th of May, 1889.)

This Lamp and Top, being made entirely of Glass, is perfectly impervious to corrosion, and therefore invaluable in Manufacturing and other Towns. The Top can be had in clear or coloured Glass and is much cheaper than the old style of metal frames. The New Lamp can be adapted to the old metal frame top.

Prices on application.

PILKINGTON BROS.,
Glass Works, St. Helens, Lancashire.

WILLIAM INGHAM & SONS,

WORTLEY FIRE-CLAY WORKS,
Near LEEDS,

Have confidence in drawing the special attention of GAS ENGINEERS to the following advantages of their Retorts:—

1. Smooth interior, preventing Adhesion of Carbon.
2. They can be made in one piece up to 10 feet long.
3. Uniformity in thickness, ensuring equal Expansion and Contraction.

PATENT
MACHINE-MADE GAS-RETORTS.

THE THAMES BANK IRON CO.
UPPER GROUND STREET, LONDON, S.E.,
SUPPLY FROM STOCK
CAST-IRON RETORTS
AND ALL KINDS OF GAS-WORKS APPARATUS.
SOCKET-PIPES FOR GAS OR WATER PURPOSES.
FLANGE PIPES FOR STEAM.
Sole Manufacturers of LYON'S 'PATENT' GAS MAIN SYPHONS,
AGENTS FOR
ATTERTON'S PATENT APPARATUS for CHARGING RETORTS.

OXYGEN, OXYGEN, OXYGEN.
(Extracted from the Atmosphere by **Brin's Patent Process.**)
40,000 cubic feet always in Stock.

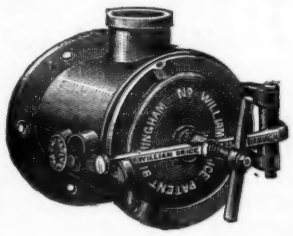
Managers of Gas-Works supplied with Oxygen compressed in Weldless Steel Cylinders, for experimental purposes, &c., at special rates.
Estimates given for the erection of Oxygen Producers in Gas-Works, &c.
Managers of Gas-Works specially invited to inspect our Works.

The Manchester Oxygen (BRIN'S PATENT) Co., Ltd.,
GREAT MARLBOROUGH ST., OXFORD ROAD,
MANCHESTER.
Manufacturers and Compressors of all kinds of Gas.

WILLIAM GRICE & CO.
Ironfounders, Gas and General Engineers,
Fazeley Street Works, BIRMINGHAM.

MANUFACTURERS OF
Grice's Patent Self-Sealing Mouthpieces.
To suit all sized sections of Retort. Over 70 stock sizes. Largely used in England.

Grice's Patented Stoking Machinery.
Made to suit large or small Gas-Works. The one machine draws the spent coke and recharges the Retort at one operation. Self-contained; working from engine on base or by hand. Price and particulars on application.



PURIFIERS, TANKS, PIPES, & OTHER PLANT MADE.
Machine-Moulded Spur, Bevel, Mitre, and Helical Wheels and Pulleys, to 20 feet diameter.
WROUGHT-IRON WAREHOUSE CRANES
As supplied to the English Railway Companies.
MORTAR & LOAM MILLS.
With or without Engines.
PUNCHING AND SHEARING MACHINERY
Of all Kinds.
ENGINES. Vertical and Horizontal; High and Low Pressure
CONDENSING BOILERS; Tubular and Ordinary CASTINGS.
All descriptions up to 15 tons.

SIXTY PER CENT. ECONOMY IN GAS LIGHTING.
The Schülke Regenerative Lamp

FOR
DOMESTIC AND EXTERNAL LIGHTING.

The only Regenerative Lamp employing the Common Flat-Flame Burners.

Lamps giving 20-Candle power consume less than four feet of Gas per hour.

PURE WHITE & PERFECTLY STEADY LIGHT,
NOT AFFECTED BY DRAUGHTS.

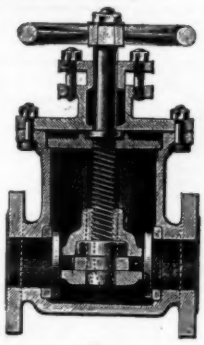
Suitable for any existing fittings (Brackets or Suspending).
Can be fixed in a few minutes.

May be seen at the Offices of the
SCHÜLKE GAS-LAMP Co.
LIMITED,
Room 446—11, QUEEN VICTORIA STREET,
LONDON, E.C.,
Where Price Lists and full particulars may be obtained.

W. H-SPENCER & CO.,

HITCHIN, HERTS,

— ENGINEERS. —



PATENT CAM FULL-WAY VALVES,

1 INCH to 8 INCHES,

Instantaneous Grip and Release, occupying less Space than any other Full-Way Valve; made with either Internal or External Spindle. Gun Metal or Phosphor Bronze Valves, Seats, and Spindles.

Prices on Application,

CAST-IRON SYPHON PUMPS.

2½ by 6 in. Stroke - - £1 10 0 each.
2½ by 9 in. „ - - £1 16 0 „

WROUGHT-IRON DITTO.

2½ by 6 in. Stroke - - £1 13 6 each.
2½ by 9 in. „ - - £1 19 6

NET.

S. PONTIFEX & CO.,

GAS and WATER ENGINEERS,

Manufacturers of and Contractors for the Maintenance of

PUBLIC LAMPS & LANTERNS;

GLASS—Flint Opal, and Bent in Stock, and Cut to Sizes.

WELL LAMPS, STREET NAME TABLETS,

LAMP COLUMNS, HEAD IRONS, PUTTYLESS LAMPS,

LANTERN COCKS, REGULATORS,

Improved High-Power Lanterns for Lighting Street Refuges and Open Spaces.

BROWN'S PATENT

LAMPLIGHTERS' TORCHES.

PROPRIETORS AND MANUFACTURERS OF

BOX'S PATENT

PUTTYLESS STREET LAMP.

This Lamp may be supplied fitted with clear opal, or ribbed glass, *as also with enamel tops* if required. The necessary fittings for altering existing Lamps to this system can be supplied at moderate prices.

S. PONTIFEX & CO., 22, COLEMAN ST., LONDON.

Works: 18, STEPHEN STREET, TOTTENHAM COURT ROAD, W.

GAS COAL.

BEST

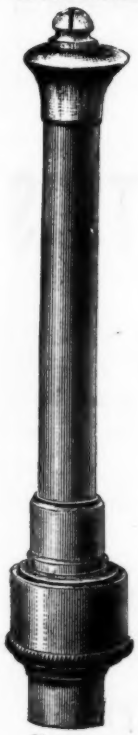
REAL OLD SILKSTONE GAS COAL.

Address, THE STRAFFORD COLLIERIES COMPANY,

Near BARNSLEY, SOUTH YORKSHIRE.

ORME'S GAS REGULATOR FOR STREET LAMPS

(Behl's Patent)



No. 200.
LAMP REGULATOR
Full Size.

Adopted by the leading GAS COMPANIES AND CORPORATIONS.

More than 150,000 now in use.

Strongly made, all Brass, as Illustration No. 200,

Price, 24/- per dozen.

No. 201, ⅜ B Socket.
„ 202, ½ B Socket.

ORME'S GAS REGULATOR

(BEHL'S PATENT),

No. 201, 202, 203, FOR DOMESTIC USE,

Saves from 20 to 50 per cent. of Gas.

Gives a bright and steady Light.

Price, 15/- per dozen.

SAMPLES UPON APPLICATION.

No. 203, Taper Screw.

STREET LANTERNS OF NEW DESIGNS.

IMPROVED LAMP TORCHES.

ALL BRASS. EXTRA STRONG.

PRICE LIST AND FULL PARTICULARS UPON APPLICATION.

GEORGE ORME & CO., ATLAS METER WORKS, OLDHAM.

Telegraphic Address: "ORME OLDHAM."

W. PARKINSON & Co.,

GAS ENGINEERS.

London, 1885.

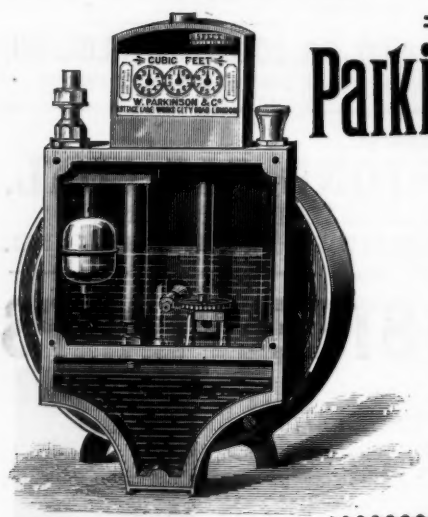
GOLD AND SILVER MEDALS,
London, 1884.

Melbourne, 1888-9.

ESTABLISHED 1816.

THE ORIGINAL MANUFACTURERS OF

WET METERS



Parkinson's Ordinary Wet Meter

IN CAST-IRON CASE.

Works with very little friction. Will stand very high pressures. Cannot possibly be shut off by sudden increase of pressure, the Float being affected by Outlet Gas only. Allows for loss of water by evaporation without materially affecting the registration or shutting off the gas. Unexcelled for simplicity of construction, excellence of workmanship, or accuracy in registration.

COMPENSATING METERS

IN TINNED OR CAST-IRON CASES.

The Slow-Spoon Compensator has been in extensive use for many years; it maintains an unvarying water-line without appreciable friction, and provides a large reserve of water. The Float arrangement allows sudden or excessive pressure on the Inlet without affecting the working of the Meter or extinguishing the Lights.

ALL WET METERS ARE FITTED WITH OUR

Patent Three-Partition Measuring Drums.

Also Makers of DRY METERS of the VERY BEST QUALITY.

COTTAGE LANE WORKS, CITY ROAD, **LONDON.** | BELL BARN ROAD WORKS, **BIRMINGHAM.** | OFFICE: 10, MAWSON'S CHAMBERS, DEANSGATE. **MANCHESTER.**

Telegraphic Address: "INDEX LONDON."

[See also Advt., p. 826.

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